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Railway Age

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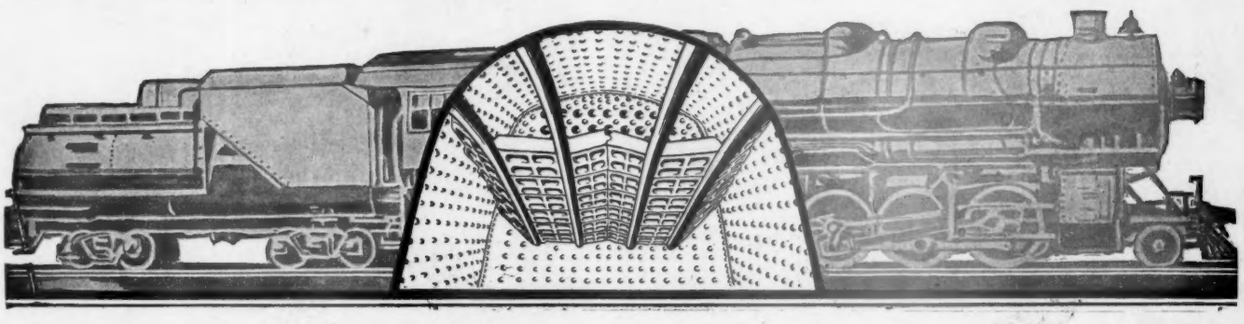

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Security Sectional Arch

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"ACCO"
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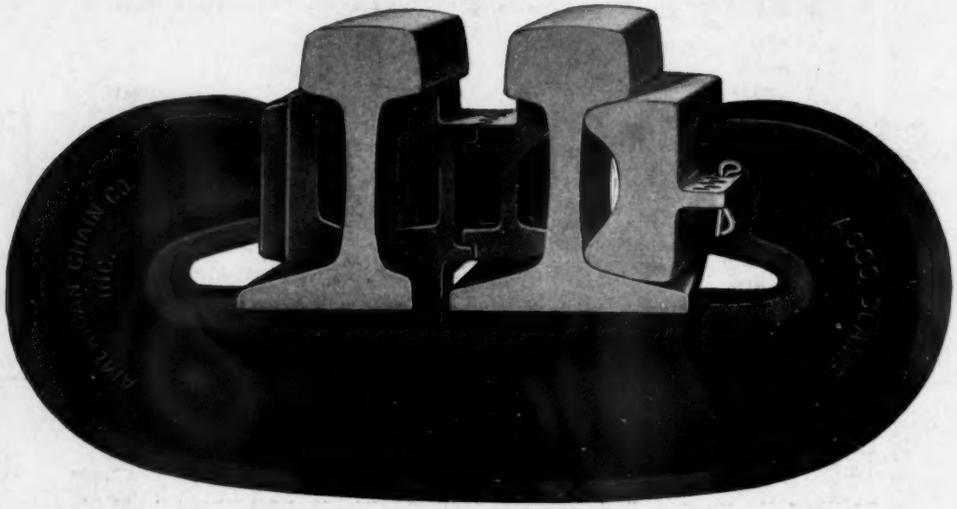
GUARD RAIL CLAMP



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EDITORIAL
Railway Age

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One Big Thing That Is the Matter with the Railroads

LET RAILWAY officers consider the following statements of fact and the following questions:

The railways of the United States are at least as efficiently operated as any others in the world. They are as efficiently managed as any other class of business concerns in this country.

Why, then, does the public lend a willing ear to charges that they are inefficiently managed and to canards such as that Henry Ford, by his operation of the Detroit, Toledo & Ironton, has "shown up" the managements of other railways?

The railways of the United States are the most conservatively capitalized railways in the world. They are at least as conservatively capitalized in proportion to investment as any other class of business concerns in this country.

Why, then, do so many of the people of the country believe they are grossly overcapitalized?

Railway rates on most commodities are today lower compared with ten years ago than the prices of most commodities.

Why, then, does the public loudly and almost universally complain about railway rates rather than about the prices of most commodities?

It is more economical, safer and pleasanter in almost every part of this country to make pleasure trips of any considerable length by railroad than by automobile.

Why, then, does almost everybody who thinks of taking pleasure trips, from say 50 to 200 miles in length, think of taking them in automobiles?

The railways always have been, and are now, as honestly managed as any other class of business concerns in this country.

Why, then, do many persons believe that there is more crooked financing and grafting in their management than in the management of most other lines of business?

Railway officers receive incomes relatively smaller in proportion to the importance of their duties and responsibilities than men in almost any other line of business in this country.

Why, then, do a large part of the people believe that the public is being mulcted to pay railway officers excessive salaries?

It is at least as essential to the welfare of this country that the railways should prosper as that any other industry should prosper.

Why, then, do most people rejoice when reports from the farms and factories show an increase in the prosperity of farmers and manufacturers, and at the same time think the railways are practicing extortion and regard it as a public calamity when their net earnings show that the railways are beginning to prosper?

When men make large fortunes in the manufacture of automobiles, kodaks, chewing gum, iron and steel, and publishing farm papers almost everybody rejoices. Nobody finds fault because Henry Ford has become enormously rich in the automobile business, because Eastman has become rich by making kodaks, because Wm. Wrigley has become rich by making chewing gum, because Charles M. Schwab has become rich in the steel business, because Senator Arthur Capper has become rich by publishing farm papers. Such men are among our national heroes.

Why, then, if any man should now become rich in the railroad business would he be generally denounced as a "malefactor," as most of those who did make fortunes in the railroad business in the past were denounced?

No railway officer would question that the statements of fact above made are correct. They show that in most important respects the railways have been and are well managed. They show that the railways are one of the country's very greatest assets.

Why, then, do so many people act on the assumption that the railways are the country's greatest liability?

The railway business is the business of manufacturing transportation. No manufacturing business can be successful unless its organization is highly efficient not only in production but in salesmanship. If a concern year by year is making a larger and better product, is making it with relatively greater and greater efficiency and economy, and is selling it at less and less profit to itself can there be more than one explanation of what is the matter with it? The true and only explanation must be that it is failing to "sell" itself to its customers adequately, wisely and effectively.

What is wrong with the salesmanship of the railways? We do not pretend to be able completely to diagnose the case, but we can mention some pertinent facts. In a period when concerns of other kinds have spoken extremely well of themselves in loud tones, the railways for the most part have kept modestly silent. In a period when many have exploited the great advantages of passenger and freight transportation

by motor and by water, the railways have hardly exploited the advantages of transportation by rail. In a period when many other industries have directly and indirectly attacked the railways, the railways have made no counter-attacks. They have stayed on the defensive, or turned the other cheek.

In a period and in a country when and where advertising as a means of selling institutions and goods to the public has been used more extensively and in more original and varied ways than in any other time or country in history, the railways have done relatively only a negligible amount of advertising, and have done this almost solely to exploit the least profitable part of their business. Apparently the largest expenditure that the railways ever made for advertising was in 1916 when it was $7,500,000. This was *two-tenths of one per cent* of their total earnings. The following are the percentages of their gross earnings spent for advertising in normal years before the war by certain concerns in widely varying industries. A large mail order house, 10 per cent; two tobacco manufacturers, 5 per cent and 6 per cent; a maker of phonographs, 5 per cent; a maker of paint, 3½ per cent; a maker of cement, 2 per cent; a maker of kodaks, 3 per cent; a maker of soap, 3 per cent; a manufacturer of men's collars, 3½ per cent; a manufacturer of men's clothes, 2 per cent; four makers of automobiles, three-fourths of one per cent to 2.6 per cent.

These are typical examples. If the railways should spend in advertising a percentage of their total earnings equal to the *smallest* percentage mentioned in this list their expenditures for advertising on the basis of their present earnings would be $42,000,000 a year. Their actual expenditures for advertising in 1920 were $4,140,000. Under normal conditions the amount spent for advertising to sell passenger automobiles alone is six times as great as was spent in 1920 to sell all the railroads and all their service to the public, and more than three times as great as the largest amount that the railroads ever spent for advertising in any year.

The railways have many difficult and important problems to solve to which they are giving consideration. The most important problem they must solve if they are ever to be allowed to earn reasonable profits, and if private ownership and management are to be perpetuated, is the problem of selling themselves to the public. The amount of constructive and effective study, effort and expenditure being devoted to the solution of this problem on most railroads by the officers who must solve it, if it is ever to be solved, is so small as to be almost negligible.

The railroads are not being "sold" to the public, unless by their enemies. They never will be "sold" to the public unless there is a great awakening among the managements to a realization of the fact that here is a great problem about which most of them are doing practically nothing at all, and which one might think many of them do not even know exists.

Should Railroads Buy on a Price Basis?

The master painter of a certain railroad not long ago made a requisition for varnish for passenger cars. He specified a brand that always gave satisfactory service, but when the material was delivered found that a cheap grade made by a less reliable manufacturer had been furnished. A few days later when the master painter met the purchasing agent he asked why the cheap varnish had been bought and pointed out that the cost of applying it was more than the cost of the varnish itself so that there was little difference in the total expense, although the low grade material would not last nearly as long. The purchasing agent replied, "If a man does not have money enough to buy a straw hat, he has to make his felt hat do, and this railroad is in the same fix; it simply does not have money enough to buy high priced materials and we have to make cheap material do." This seems to be typical of the viewpoint of some purchasing agents who take the position that the road is too poor to buy material that is higher in price but more economical in the long run. Is such a practice justifiable? As an expedient to avoid a receivership it might be justified temporarily, but as a permanent policy, never. The analogy cited by the purchasing agent does not correspond to the actual situation. The railroad that buys the cheap varnish will find it fails to give the necessary protection to the equipment and the road will soon have to spend money that it might have saved by using first-class material. There is one principle in railroad purchasing which in the interest of economy no road can afford to ignore; that is to follow the recommendations of the specialists in the various departments regarding the purchase of materials.

To Go or Not to Go

Less than a month has yet to elapse before the railway civil engineers throughout the country will meet in Chicago in their twenty-third annual convention; to renew old friendships, to establish new ones, to view the developments in equipment of immediate concern and, more important than these, to participate in the deliberations of a three-day session. Taking cognizance of this many engineers who have never entertained other than the thought of attending, have in all probability already done some planning preparatory to their departure to avoid as nearly as possible the development at the last moment of conditions unfavorable to their plans, as well as to insure the proper functioning of their departments while they are gone. On the other hand many others, if cognizant at all of the association's custom and the proximity of the convention, have yet confronting them "To Go or not To Go" as an undecided question. Comment need not be made concerning those who have definitely laid their plans, but, in the interest of better railroading, it may well be made concerning those who have not. Men who devote their time and thought largely to engineering problems of the many kinds involved in railway construction, operation or management, should by all means know of the association and should attend its convention, whether members or not; going as to an event from which each cannot afford to be absent. For such is the case. The American Railway Engineering Assosociation is an institution with a constituenecy which for intellectual ability, sobriety of thinking and industry in its deliberations, is a fit object of pride on the part of its members. The reports presented and discussed are the work of groups of men especially qualified in their particular lines, but far more important to the engineers, they treat of subjects which are his stock in trade; not incidental to his status but fundamental. He may very easily avoid the anticipated inconvenience incident to his attendance at the convention and not having attended feel himself no-wise the loser for not having gone, but under ordinary circumstances

in doing this he will have made a mistake. The convention is his opportunity, in realization of which the prudent engineer will go if he can.

Double Track and the Standard Code

To many men in train service on double track lines the standard code is a mysterious thing. On it they are examined at more or less frequent intervals, but most of its provisions have no relation to their daily activities. They work under block signal protection and with few train orders. Instructions which, under the standard code, must be given by train order in specific language they often receive as messages for which no standard form is provided in the rules. All this is confusing and tends to make these men unfit for service on single track branch lines when, upon occasion, they are needed there. There is, of course, no reason why unwarranted restrictions should be placed upon double track operation, but men in train service should be able to tell why certain standard practices are omitted on double track. When they are examined on the subject of train orders they should be required to tell what additional safeguards provided by double-track and automatic signals sometimes make the rules concerning specific train order forms unnecessary and, conversely, why these rules are necessary on single track. The failure to appreciate that aditional safeguards have been provided by the double track and automatic signals tends to give the employee the impression that his company is not insisting upon obedience to rules and this impression may be harmful to discipline. Certainly an employee holding such a view cannot be trusted on single track where strict adherence to rule is absolutely essential.

Troubled Railroads versus Troubled Grocers

The railroads have suffered from the business depression less than have the grocers, according to the declaration of a prominent speaker at a convention of wholesale grocers in New York City last week; and therefore a reduction of freight rates should be the first thing to be done to restore prosperity in that branch of the mercantile world. Not being very well informed concerning the profits made by the wholesale grocers during the past few years, we will for the moment, and for the sake of argument, admit that they are, really, worse off than the railroads. But, from the standpoint of the public, why should it follow that the railroads ought to carry freight at less than cost? The public needs railroad transportation and it needs wholesale grocery establishments. We will assume that it has difficulty in keeping up both institutions, and may be obliged to impose hardships on one or the other of them. Now, which shall it be? Or, to go a step farther, assume that both have already been neglected; which of the two ought first to be aided to recover? Setting aside all notions concerning what we should like to do, or what is ideally just and equitable, in the premises it would seem clear that the railroads ought to be succored first. Not because the railroads' owners are a better class of people; neither because they deserve the better treatment; but because *that course is forced by the nature of the case.* A railroad, if it serves important communities, must be kept going even if to do so should require an assessment on the inhabitants to furnish fuel for the locomotives and food for the trainmen. Nothing can take its place. In place of the merchant, on the other hand, some halfway makeshift can be made to serve temporarily. The people—the communities—have established the typical railroad in such a monopolistic situation that they cannot allow it to suffer, any more than the city of Chicago could afford to close up its most important bridge across Chicago river. The grocer is not thus treated; he is not classed as a vital part of the civic machinery. The community makes him take his chances. Whether or not that is fair is not the question; it is the fact. Even if he has failed and shut up shop, the railroads must be kept going.

A Chance for Reciprocity

The upkeep of railway crossings is usually imposed on the junior road, not only for the renewals of the rail structure, the timbers and the ballast but also the maintenance of line and surface. The expense incurred by the maintaining road is affected to no small extent by the degree of co-operation offered by the maintenance forces of the other road using the crossing. While the senior road should not be expected to relieve the junior company of any of its established responsibilities, it should maintain its own tracks adjacent to the crossing in a condition that will tend to relieve rather than increase the burden of keeping up the crossing. For instance, the life of the crossing will be influenced to no small degree by the condition of the rails immediately adjoining it. Badly worn rails connected to a new crossing will produce such poor joints that the crossing rails themselves will soon become battered. Also the alinement of a crossing is seriously affected by the creeping of the rails of the intersecting tracks. If the non-maintaining road does not provide adequate anchorage to hold its track, it will cause the maintaining road no end of trouble in keeping the crossing in place. So severe has been the burden on the maintaining road from this cause that it has even been proposed to place rail anchors on the rails on the other property with the idea that the money so spent would be more than offset by the decreased cost of work on the crossing itself. However, such a course ought not to be necessary. The railroads ought to practice reciprocity at least to such an extent that crossings will be maintained at the least possible cost, regardless of the apportionment of the expense. It is only by so doing that true economy for all will be obtained.

Able Shop Foremen Must Be Developed

In a recent issue of Industrial Management, V. M. Palmer, engineer of industrial economy for the Eastman-Kodak Company, says, "Foremen are frequently referred to as the non-commissioned officers of industry, which position they do in fact occupy between the management and the employee. There is no question that the need for greater shop and individual efficiency could be realized more completely if foremen measured up closer to the requirements of their position." This statement applies with equal force to industrial foremen and those employed in railroad shops. Owing to the importance of foremen and their direct influence for good or bad on the cost of shop operation, it is important (1) that they be paid a sufficient remuneration to attract men of the necessary calibre; (2) that shopmen of ability be trained and wherever possible given actual experience as acting foremen while regular foremen are sick or on leave of absence; (3) that present foremen be helped and encouraged in every possible way in the performance of their duties. This does not mean that discipline should be relaxed and no mention made of mistakes. With few exceptions foremen take constructive criticism in the spirit in which it is given, realizing that unless weaknesses are pointed out they cannot be corrected and personal improvement and ultimate advancement will be correspondingly delayed. Moreover, when weaknesses are not explained, they tend to grow worse rather than better and may in the end entirely disqualify a foreman for his position. He is then reduced to the ranks and, not knowing wherein his failure lies, can hardly be blamed for feeling that somehow he has not had a square deal. If errors should

be pointed out, it is fully as important to bestow praise where due. Unfortunately, many railroad men get the impression that good work is taken for granted while trivial mistakes receive undue censure. No matter how busy the higher mechanical department officers, they miss a fine opportunity to develop foremen if for any reason the word of helpful criticism or of appreciation for a job well done is withheld.

The Ability of the Carrier to Pay

SINCE THERE is but one source from which the money to meet a railroad payroll can come, namely earnings, it follows that where the earnings of a railroad are less than its operating expenses, the ability of the carrier to continue to pay certain wage scales to its employees must become eventually the governing factor in determining what constitutes "just and reasonable" wages. An inexorable economic law applies to compel either the downward revision of all its operating expenses, and particularly the preponderating labor expense, or the abandonment of the property. Here, public interest in, and necessity for, transportation service tips the balance in favor of the readjustment of operating expenses. The problem presented in such cases is cold fact and not theory. The Railroad Labor Board has faced it many times and on three occasions has recognized that the "ability of the carriers to pay" is a relevant and vital factor in fixing wage levels in some cases.

In deciding a dispute between the Electric Short Line Railway Company and the train service brotherhoods last October, the Board ordered a wage cut of 20 per cent, adding that the lower wages were just and reasonable, taking into consideration all the conditions and circumstances as contemplated by the Transportation Act, including the financial condition of this carrier, i. e., its earnings, cost of operation, etc. Again, in deciding a dispute between the New Orleans Great Northern and several classes of its employees, the Board recognized and specifically stated that the "ability of the carrier to pay is entitled to secondary consideration with a certain type of carrier dependent almost entirely on local business or whose principal function in the final analysis is the development and upbuilding of a new or comparatively new country." Now a third instance of the recognition of this principle is contained in the Board's decision in the Missouri & North Arkansas case (described elsewhere in this issue) in which the employees have been ordered to accept wages 25 per cent below those paid on other Class I carriers. In all these cases proof was submitted of the failure of earnings to meet operating expenses. In each case the choice was between reduction of wages, bankruptcy or abandonment. Whatever interpretation the Board might wish to put on the seven "relevant factors" stated in the Transportation Act as controlling considerations in fixing wage scales, the issue in each of these cases was clear cut; either the "ability of the carrier to pay" governed or it did not. If it did, the public's right to continuous operation of the railroad was recognized by a body created to protect that right. If it did not, that unfortunate expression "the public be damned" became a truism. The Board should be commended for its decisions in these cases, not because they represent a "victory" for the railroads involved, but because they represent a "victory" for the public.

But having acted wisely in these cases, will the Board continue to face this issue squarely? It is just as possible for a road of 10,000 miles to face an inability to pay the wages fixed by the board, as it is for a road 100 miles in length. The principles in each case are exactly the same. Would the board then apply the same reasoning as applied in these three cases and permit the larger carriers to present evidence of their inability to pay?

During the hearings on national agreements in January, 1921, the railroads in the country were facing just such a situation. They tried to present evidence to the board showing their inability to continue to bear excessive labor costs. In that case, however, the board ruled that: "all questions involving the expense of operation or necessities of railroads and the amount of money necessary to secure successful operation thereof, are under the jurisdiction not of this board, but of the Interstate Commerce Commission." The testimony which the carriers desired to present was ruled out of court as irrelevant.

The inconsistency in the board's rulings on this factor would indicate that the interest of the public in the operation of a large carrier or a group of carriers is less than its interest in the operation of a smaller road. Obviously such a theory is untenable. It is hard to believe that, having ruled as it has in the Electric Short Line, the New Orleans Great Northern and the Missouri & North Arkansas cases, this body, created largely to insure continuous operation of the railroads, will hold to its ruling in the national agreements case and prohibit testimony on the "ability to pay" in future cases involving either small or large carriers.

The Increase in Freight Movement

THE INCREASES in the number of carloads of freight shipped have been so substantial and persistent since the opening of the year 1922 as to constitute a very persuasive indication that general business is reviving.

Not only did the number of carloads of freight shipped increase in every week from that ended January 7 to that ended February 11, but in each of these weeks the total shipments were larger than in the corresponding weeks of 1921. The total freight car loadings in the four weeks ended February 4, 1922, were 2,956,766 as compared with 2,812,637 in the same weeks of 1921, an increase of 144,129. While the total number of cars loaded with freight in these weeks was somewhat less than in 1920, it was larger than in 1919 and, in fact, seems to have been larger than in other previous years.

The most significant feature of this increase in shipments was that it was due to an increase in the number of cars loaded with most kinds of commodities. In the four weeks ended February 4 there was an increase, as compared with the same weeks of last year, of 33,810 cars in shipments of grain, 2,460 cars in shipments of livestock, 17,666 in shipments of coal, 129,476 in shipments of merchandise, and 1,062 in shipments of miscellaneous commodities. Shipments of coke showed a decline of 11,000 carloads, shipments of forest products a decline of 4,456 carloads, and shipments of ore a decline of 16,000 carloads.

When carloadings began to show an increase in the second week in January it was thought that this might be due to temporary causes. The taxes on transportation were removed on January 1, and it was believed the decline in freight shipments in December was partly due to the fact that some shippers were holding back commodities to avoid paying the tax and would forward them in January. If, however, the increase in shipments had been due to the release of goods held back to avoid the tax, it would hardly have continued at an accelerated rate clear into February.

It might also be thought that the increase in shipments was due to a larger movement of coal in anticipation of a coal mine strike on April 1, but while there has been an increase in shipments of coal it has been smaller relatively than the increases in shipments of other kinds.

After experience with the fluctuations in the railroad and other lines of business during the last year and a half most people are somewhat slow to acclaim any apparent improvement as permanent, or as the harbinger of still further improvements. Certainly, however, if the recent increases in carloadings indicate anything at all they indicate a distinct tendency toward improvement in general business.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated.*]

Trainmen and the Eight-Hour Day

SAN ANTONIO, TEX.

TO THE EDITOR:

"All men know the truth, but what of that? It is rare to find one who knows how to speak it."—Emerson.

I was pleased to note in a recent editorial in the *Railway Age* that the railroad executives had decided to meet with the executive officers of the railroad brotherhoods in an effort to readjust differences on the basis of a "square deal." Later I read in one of President W. S. Carter's (Brotherhood of Locomotive Firemen and Enginemen) publicity bulletins that "It has been the success of the railroads in 'educating the public' through unfair propaganda that has made it absolutely necessary for railroad employees to adopt some method of telling the truth to the public."

To get at the truth as essential to establishing the square deal it is necessary to go back to the inception of the Adamson law, which has been the cause of a world of misrepresentations and recriminations. In answer to the claim that the railroads were able to show that "under our present practice (1915) enginemen demand the right to do two men's work in order to earn two men's pay," President W. S. Carter admitted the truth of the charge, bitterly assailing those members who, as shown by the railroad representatives, ignored "the rights of their fellowmen" and through the power of senority, say to unemployed brothers: "You shall not work at all; I am going to do my work and your work too, so that I can draw my pay and your pay too. Citing individual instances of men making double wages through this system, Mr. Carter said: "At the same time we had evidence that on that same railroad they had cut the fireman's list; there were hundreds and hundreds of men hungry and their families hungry—and yet they call this a brotherhood."

This deplorable condition was made the strongest argument for the limitation of the workday to eight hours; and, in the protection of the public interest, to prevent a strike to secure this limitation of hours, the Adamson bill became law.

To refresh the memory as to the facts in the case, it is recalled that on August 13, 1916, the President sent for the brotherhood representatives and the managers to confer with him at the White House, and suggested arbitration by way of settling the controversy. The labor leaders, conscious of their strength, stating that the question of the shorter work day was not arbitrable, refused to arbitrate. Later the president referred to the situation then existing in the following words:

"I was not able to make the slightest impression upon those men. They feel so strongly the justice of their cause that they are blind to all the consequences of their action in declaring and prosecuting a strike.

"I was shocked to find a peculiar stiffness and hardness about these men. When I pictured to them the distress of our people in case this strike became a reality, they sat unmoved and apparently indifferent to the seriousness of the whole bad business. I am at the end of my tether, and I do not know what further to do."

When the sincerity of the brotherhood chiefs was questioned by the railroad executives, who asserted that a raise in pay was the real object of the move, the four executives, acting for the brotherhoods, issued a statement, saying in effect: "If you doubt the sincerity of the brotherhoods in asking for relief from the long hours of labor, arrange that the employees will not be able to make one minute's overtime."

Since the adoption of the Adamson law both sides to this controversy have dodged the responsibility for inaugurating a real eight-hour law by alleging the impossibility of enforcement. Since then, however, Mr. Ford has shown how a real eight-hour day may be put into effect on the railroad, with wages acceptable to the employees. The Pullman employees and express messengers have also enjoyed the benefits of a real limitation of hours of labor.

How different, though, has been the course of the brotherhoods. They even in the so-called Chicago agreement, governing only the engineers and firemen, provided a work month of 38 eight-hour days, with no provision for holding their members even to that limit. In fact, it is common knowledge that this limitation is constantly ignored, with the result that the railroad managers are still able to show these "high peaks" in earnings. And this, too, when thousands of the 75,000 members of the brotherhoods who bared their breasts to the enemy in the late war are unable to support themselves and their families. As to the conductors and brakemen, so far as any action of their organizations is concerned the eight-hour day has been a sham and a fraud. In fact, by official action train crews have been taken out of the service while other crews were making far beyond the mileage contemplated by the law.

Representatives of labor organizations generally complain of the provisions of the Transportation Act that the earnings of capital are carefully protected by the instructions given to the I. C. C. to establish rates that will provide standard returns as dividends, while the chief argument being advanced for reduction of earnings of employees is that the high rates necessitated by this provision are paralyzing business and the rates cannot be lowered except through reduced wages. While agreeing that these requirements of the law are not conducive to the "square deal" to labor, I am constrained to call attention to the fact that there appears to be no disposition on the part of the brotherhood executives to conserve the welfare of the thousands of loyal members who have been separated from their means of living through cutting down the working force, by enforcing the limitation of hours on the members protected in the "high peaks" of earnings by seniority rights.

That the power to limit hours of service exists in the brotherhoods is shown by the fact that it is rigidly enforced among the employees in yard service. At least there has been no evidence of demands made on behalf of the yard men that they be permitted to increase their earnings by working overtime at the expense of the out-of-work brother.

While the influence of the organization executives has been invoked to continue passenger conductors in their long hours of service, the effect of this policy is shown in the fact that, notwithstanding the law requires that wages shall be fixed, among other things, on the basis of "the training and skill required," and "the degree of responsibility," executives have accepted for them a lower rate of pay than is accorded firemen and through freight brakemen. In fact, brakemen deadheading on a train not infrequently receive a larger rate of pay than is accorded the man in charge of the train.

May it not be due to this condition, and the difficulty experienced by many passenger conductors to preserve the standard of living required of them on the wages they receive, that many of the most experienced and valuable employees, who have acquired their value to the company through their years of loyal service, have been removed from the service because of irregularities?

Let us have the truth and a square deal. Think it over.

F. J. BAILEY.

What Is Ahead of the Chief Clerk?

BOSTON, MASS.

TO THE EDITOR:

I have followed with much interest the various communications relating to the chief clerk which you have published during recent months. Two or three of these letters took issue directly with the one and only communication (August 6, 1921, page 236) that I ever wrote to any paper. I should particularly, however, like to comment on the reply which was made by Grant Gibson in your issue of October 8. His letter takes up the case from three entirely different angles. He assumes a point of view on my part that is entirely absent; this is evidently due to faulty expression or my desire to condense to the minimum number of words.

I have never had in mind, or seen, any antagonism between an official and his own chief clerk. I have grown up in the operating department, as he assumes, and have held positions from trainmaster to general manager. I have had several chief clerks and but one that was unsatisfactory; in the others I have had the utmost confidence and have received from them the fullest support. My article was intended rather as a criticism of the official than of chief clerk.

To take up the case from its first angle; namely, the future for a man who takes a clerical position and who works up to the position of chief clerk. It may seem hard to say so, but it is very difficult for any man whose experience has been entirely in an office to successfully assume an official position of the rank of superintendent, superintendent of motive power, or higher. Of course, there are exceptions but they are very few. The greater part of a railroad's business is done outside under conditions entirely different from any other form of industry. A certain amount of experience out on the road is, in my opinion, essential to make a successful operating official.

Three of the chief clerks that I have had in the past are at present successful operating officers but I credit this to the fact that upon advice each gave up his position as chief clerk and went on the road, or in the shops, in a minor official capacity, from which, as a result of their early and long inside experience, they were promoted rapidly. There are three or four more just as efficient men, who are still chief clerks, who refused to take this advice and are in the blind alley referred to. I think the above answers the question as to what is ahead of the chief clerk.

Taking the case up from the second angle, the one that I have had mostly in mind, is the modern tendency to overload the chief clerk. This is due to two causes; one the natural tendency of many men to allow their chief clerks to relieve them of much responsibility, having sufficient work coming to them anyhow, due to the over-centralization which has been creeping into our railroads for many years. This tends to take responsibility away from the minor official, starting with the supervisor of track, division engineer, master mechanic, and up, bringing cases into the higher offices where the recommendations of these men and instructions to these men are largely handled by the chief clerk of their superior. Regardless of the ability, loyalty and industry of the chief clerk, if the divisional or district officer is competent, his judgment should be reversed by, and instructions to him on matters other than of the merest routine should only be from, his superior officer. Unfortunately, on many railroads this is not so. It does not stop with the division superintendent's office but goes all the way up. It often results in improper, although honestly given, decisions, and restricts the individuality and the responsibility of the lower official and brings about the very condition complained of—a swamping of the work in the higher offices. That is what I mean by having officers do more work and chief clerks do less. If, for example, a communication from a superintendent in person is not of sufficient importance to warrant the personal attention of his superior it means either his authority is not sufficient or he is not big enough for the job.

The most important element in railroading, as in any other business, is the personal one. No man likes to be criticised or likes to receive vital instructions from other than his "boss." For that reason letters of criticism should never be dictated or signed by other than the responsible official. Many of us will ofttimes sign a letter we would not have written ourselves on the theory that perhaps a little criticism will do no harm, at the same time feeling that it is probably too strong. Such cases do incalculable harm to the morale of subordinate officers.

Quite the reverse of Mr. Gibson's assumption, my experience with my own chief clerks has been pleasant and satisfactory. Also I have had very little trouble with other people's chief clerks. I have in mind the good of the business as a whole; and, to be perfectly frank, the railroads cannot be run by chief clerks, although there is a decided tendency in that direction. "OPERATING OFFICIAL."

Yardmasters Disclaim Connection With C. G. Poirier

CHICAGO.

TO THE EDITOR:

In your issue of February 11, page 393, considerable space is devoted to the testimony and opinions of C. G. Poirier before the Senate committee on Interstate Commerce. If the writer's memory serves him correctly this is the same gentleman who appeared before the Interstate Commerce Commission during the hearings before that body in October, 1920, claiming to represent all classes of supervisory officers, but, when questioned by an officer of one of the subordinate official organizations, acknowledged that he represented between 200 and 300 individuals. The facts will be found in the record of hearings Ex Parte 72.

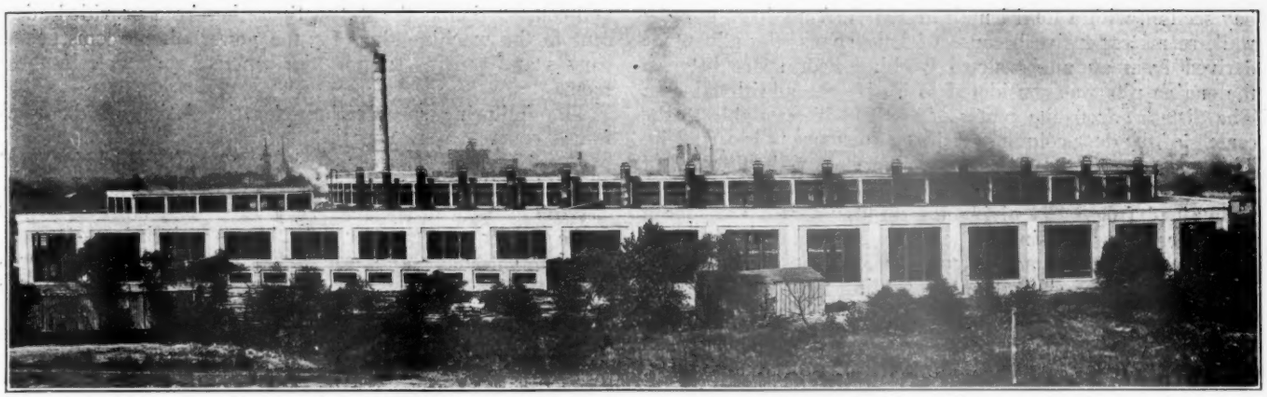
Mr. Poirier is reported by your Washington correspondent as saying that "in my opinion or perhaps my imagination the purpose is to hand those organizations over to the federations later, etc." We have very little respect for Mr. Poirier's opinion in this matter, but we have the most unbounded admiration for his imagination, for to imagine the train dispatchers, the yardmasters, the agents, or the mechanical foremen handing their organizations over to the "federations" is some mental feat. And we are prone to wonder what has so stimulated Mr. Poirier's imaginings since October, 1920, when, according to the record referred to above, he addressed the Interstate Commerce Commission as follows:

> "I just want to say this: It stands to reason that the organizations of subordinate officials were organized for the purpose of withholding themselves from labor organizations. That is true or they would not be here today. They would be affiliated with the American Federation of Labor."

As we have maintained before, the organizations enumerated above came into existence because there was a real need for them in the conditions that existed at the time and that had existed for years past, and one of the impelling motives was to escape the very thing that Mr. Poirier imagines is about to happen.

We have the greatest respect for the fairness and justice of the *Railway Age,* but we cannot help but feel that it has to a certain extent erred in giving so much space to this statement. We do not profess to know what motives have actuated Mr. Poirier in his various appearances in Washington, but we are quite sure that he does not speak for any more men, or any different interests, than he did when he appeared before the Interstate Commerce Commission in October, 1920.

J. L. ELDRIDGE,
First Grand Vice-President, Railroad Yardmasters of America.



The Simplicity and Harmony of the Design Is Admirably Shown Here

An Engine Terminal for Economical Operation

Central of Georgia Constructs Combined Roundhouse and Shops of Advanced Design at Columbus, Ga.

By G. W. Tutan
Assistant Engineer, Central of Georgia

THE CENTRAL of Georgia has completed and put into operation at Columbus, Ga., an engine terminal, fully equipped to handle 2-6-6-2 Mallet locomotives and to make heavy as well as running repairs. To secure maximum economies in locomotive terminal operation, the enginehouse has been designed to include a combination of a roundhouse with 15 radial stalls, 120 ft. long, and a power plant and machine, blacksmith and boiler shops. The structure is semi-radial or semi-rectangular in shape, being a combination of the two general types of buildings and is built of reinforced concrete throughout. The roof has a raised section or monitor and is built up from monolithically poured roof slabs, beams and girders. The center bay is served by a 10-ton electric overhead crane which travels the full length of the building, covering both the enginehouse and the machine shop. Stall tracks are served by a 100-ft. turntable driven by a 30 hp. electric tractor. Provision has been made for a future extension of nine stalls.

Columbus, Ga., is the eastern terminus of the Columbus division of the Central of Georgia, and is 100 miles west of the company's main locomotive repair shops. Mallet engines of the 2-6-6-2 type, weighing 308 tons each, are operated over the main lines of this division leading from the Birmingham coal and iron fields to points south and east. It is now possible with the new facilities to handle heavy and running repairs quickly and economically on this division.

In considering a location for the proposed engine terminal, two sites were available. One site was three miles east of the city and the other was the existing engine terminal, located in the city limits within a few blocks of the business district.

The Effectiveness of the Lighting and Ventilation Produces a Clear Interior

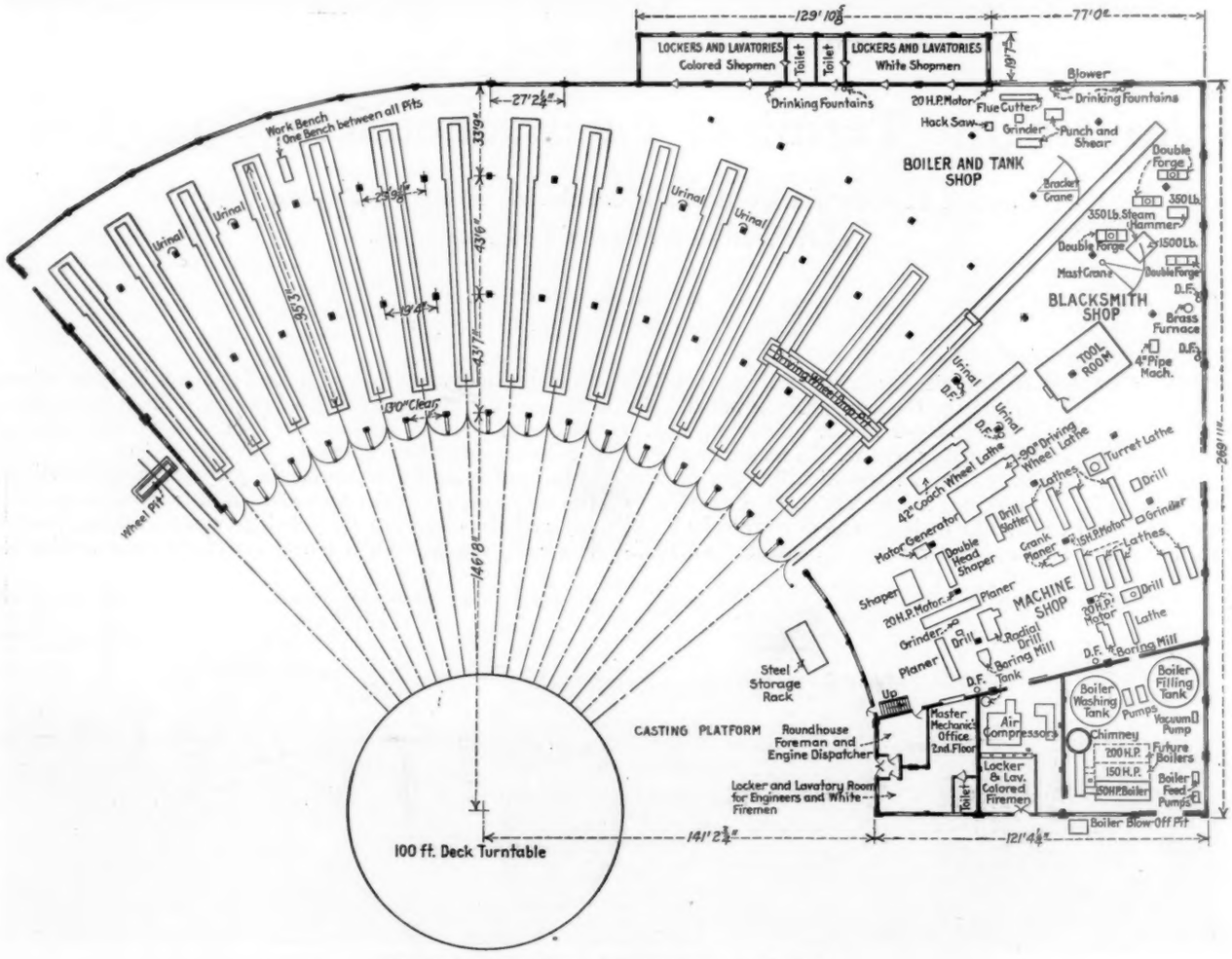
The site of the existing engine terminal within the city was selected because it was more desirable from the point of view of a reliable supply of labor and because a duplication of certain existing facilities would have been necessary at the site east of the city. There were two other important influencing factors, namely, the site east of the city would have added three miles to a district already 57 miles longer than the adjacent eastern one, and the possibility of carrying out the new development without disturbing existing facilities or interrupting operation.

The Design of the Enginehouse Structure

The enginehouse was designed primarily for housing and repairing the 2-6-6-2 Mallet engines and although the three-

bay section, with a total length of 121 ft. from doors to outer wall, seems expensive because of long spans, the advantage derived from an unobstructed working floor space between the engine pits was considered to justify the additional cost. The distance from the center of the 100-ft. turntable to the centers of the door columns of the enginehouse is 146 ft. 8 in. This distance allows adjacent engine stall rails to meet at the turntable rim, thus eliminating the use of expensively maintained frogs, and giving the minimum roof area for a 13-ft. clear door opening.

The enginehouse is not a roundhouse, as can be seen in the illustrations. The shape of the building was fixed to some extent by the limits of the site and also from experience with an enginehouse of that shape on another division of the



General Floor Plan of Roundhouse and Shops

Central of Georgia, where it was found that the location of the shop facilities under the same roof with the enginehouse resulted in economies in operation and increased efficiency in supervision. Four stalls of the enginehouse are now used in conjunction with the triangular portion of the building for machine tools. Foundations at the north end of the buildings have been provided for extending the house nine more stalls at a future date.

The enginehouse is a reinforced concrete structure throughout, with the concrete roof slabs, beams and girders poured monolithically except where construction joints prevented and supported on reinforced concrete columns and plain concrete foundations. The superstructure over the blacksmith and machine shops, locker rooms and offices is of the same design and construction as the stalls. Space has been provided adjacent to the machine shop for the power plant rooms. Steel trusses and purlins support the concrete roof slab in these rooms.

The following specifications for the design of the reinforced concrete were used:

(1) Live load on roof: 40 lb. per sq. ft. which included suspended shafting, water-proofing and construction loads.

(2) Stresses in concrete: of a 1:2:4 mixture with gravel as the coarser aggregate for slabs, beams and girders—in compression, extreme fibre stress of 650 lb. per sq. in. (this was increased 15 per cent at the supports in continuous tee beams); shear, unit stress in beams with longitudinal reinforcement only, 40 lb. per sq. in. and in webs of beams reinforced with stirrups and bent up rods, 100 lb. per sq. in.; bond stress in deformed bars, 100 lb. per sq. in. The unsupported length of column was not more than 12 diameters.

(3) Tension in steel: Hard grade, 18,000 lb. per sq. in. for roof slabs, beams and girders not subject to shock; 16,000 lb. per sq. in. in crane girder.

(4) Allowable bearing on soil: 4,000 lb. per sq. ft.

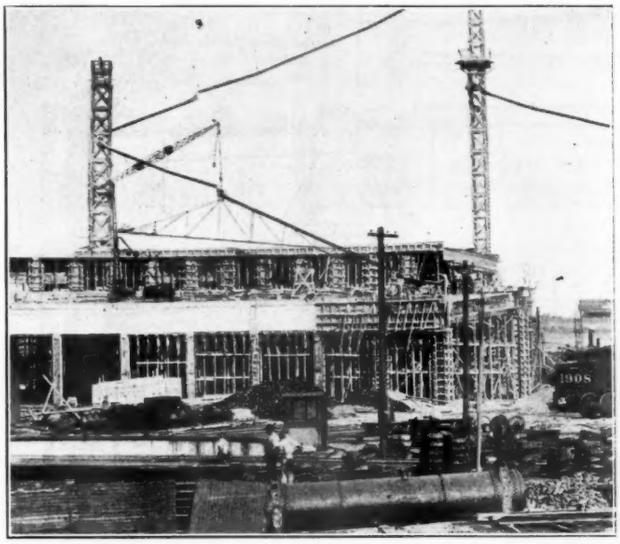
(5) Electric crane: Crane girders and columns were figured for a 15-ton crane with an impact allowance of about 15 per cent although a 10-ton crane was installed.

(6) Details: All details and items not mentioned were figured in accordance with the final report of the Joint Committee, A. S. C. E. dated January 17, 1917.

The concrete roof over the engine stalls and shop is water-

proofed with cotton seed gum applied in one coat. The roofs over the power plant, offices and locker rooms are waterproofed with a three-ply built-up felt roofing cemented with cotton seed gum. Sheet steel work has been reduced to a minimum by the use of felt flashing, cast iron and wrought iron rain conductors and copper ventilators.

Ample provision has been made for light and ventilation. Triple sash windows with narrow brick jambs fill the openings between the concrete columns in the outer wall. The



The Concrete Was Chuted From Towers Located at Various Points

sash windows are glazed with clear glass and the top and bottom sash windows are counter-balanced. The upper portions of the hinged doors between the columns on the inner circle are glazed. Pivoted sash windows fill the openings between the columns of the craneway monitor and fixed sash and wood louvres fill alternate openings between columns of the blacksmith monitor. Cast iron smoke jacks with hood openings 4 ft. 7 in. by 12 ft., located over each engine pit and suspended from the roof beams, carry the locomotive gases from the building. Wrought iron jacks 22 in. in diameter over the forges in the blacksmith shop dispose of these gases.

With regard to artificial lighting provision has been made for outlet plugs for portable lights and power on the columns between all stalls. In conjunction with this a very efficient arrangement of lamps has been obtained and the absence of shadows is particularly noted. All light and power wiring is in metal conduit embedded in the concrete structure and is thus protected from locomotive gases.

There are 15 engine pits of plain concrete with bottoms reinforced with steel rods and old rails. Each pit is 95 ft. 3 in. long on the inside. The bottom is crowned 3 in. and sloped so that the drainage is toward each end into sumps and thence into the sewers. Rail bearing timbers and blocks of creosoted yellow pine are bolted on the walls of each pit for its full length. Cast-iron wheel stops are anchored to the rails at the forward end of each pit. A driving wheel drop pit with air jack lift connects three of the engine pits and, with the traveling crane, permits wheels to be taken from three locomotives at one time. A tender wheel drop pit is built under one of the storage tracks outside of the building.

The floor of the enginehouse and shop is built on a 4-in. concrete base reinforced with wire mesh, a ⅛-in. pitch cushion, and 4-in. creosoted yellow pine blocks. The floors in the offices, locker rooms and power plant are trowel-finished concrete, treated with a metallic floor hardener. The floor between the engine pits has a one-inch crown and drains into the pits. Floor drains connected to sewers take care of the drainage in the power plant and locker rooms.

The turntable is a 100-ft. balanced deck girder steel turntable driven by a 30 hp. electric tractor. The pit walls, bottom and center pedestal are of concrete. Manganese steel heel blocks joining adjacent rails bear on a timber rim on the concrete pit wall. For handling ashes, two double bucket conveyors have been installed and are now in operation.

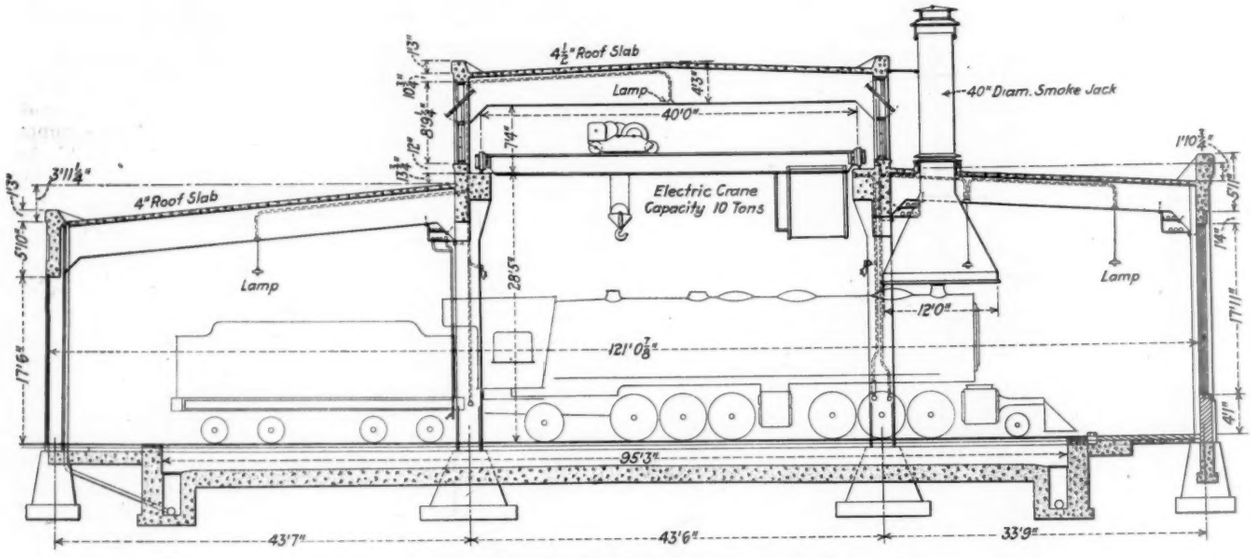
Shop Equipment Is Complete and Well Laid Out

The shopmen's locker and lavatory rooms in the rear of the blacksmith shop are provided with individual wash basins and shower baths with hot and cold water, sanitary water closets and steel lockers. The engineers' and firemen's locker rooms are similarly equipped with the exception of shower baths, but with the addition of writing tables, benches

The Layout of the Machine Shop Shows Careful Planning

and bulletin boards. Separate rooms are provided for the white and colored employees.

A 10-ton capacity overhead traveling electric crane operates the entire length of the center bay, passing over the 15 engine pits, the drop pit and the machine shop. Jib and bracket cranes are provided in the machine and blacksmith shops. All air, water and steam piping is suspended over-



Section Through Typical Roundhouse Stall

head on wrought iron hangers bolted to the concrete beams and roof slab, where any leakage may be detected and repairs made readily. Drops and valves are provided on columns between all engine pits and in the machine and blacksmith shops.

A heavy duty 90-in. driving wheel lathe and a 42-in. wheel lathe, both motor driven, have been located in positions convenient to the drop pits and wheel tracks. These, with the following tools have been located directly under and are served by the overhead electric crane.

One 100-ton hydraulic press.
One 6-ft. radial drill—motor driven.
One 18-in. rapid production slotter—motor driven.
One 25-in. heavy duty lathe—motor driven.
One 24-in. crank planer—motor driven.

The remaining machine tools are arranged in three groups, each group being motor driven and consisting of the following:

GROUP No. 1.

One 26-in. double head shaper.
One 20-in. single head shaper.
Two 36-in. planers.
One twist drill grinder.
One 20-in. emery grinder.
One 51-in. boring mill.
One 16-in. shaper.

GROUP No. 2.

One 27-in. lathe.
One 24-inch lathe.
Two 18-in. lathes.
One 4-ft. drill.
One 2-in. double head bolt cutter
One 36-in. vertical turret.
One 20-in. double head grinder.

GROUP No. 3.

One 36-in. lathe.
One 24-in. lathe.
One 14-in. lathe.
One 4-ft. radial drill.
One 12-in. brass lathe.
One 3 by 36 turret lathe.
One 18-in. turret lathe.
One 3-in. turret lathe.
One sensitive drill.
One horizontal boring mill.

The Beginning of the Radial Section—A Business-Like Round House

The pipe shop is equipped with a 4-in. motor-driven pipe machine, tilting brass furnace using crude oil for fuel, two coke metal fires and a portable fuel oil burner used for heating and metaling crosshead shoes, etc. The blacksmith shop is equipped with double forges and also an open or heavy fire served by a two-ton mast crane which also serves a 1,500-lb.

steam hammer. A 350-lb. steam hammer takes care of the small work. Other tools and facilities have been installed in quantity and quality necessary to round out the facilities for making economical repairs.

The shop, locker room and office portions of the building are heated by a direct radiation, vacuum return, low pressure steam heating system. Cast-iron wall radiators are attached to the concrete columns and brick walls under the windows. Steam is furnished by the power plant boiler. Climatic conditions make it unnecessary to have radiation in the engine pits.

An efficient boiler washing system, consisting of pumps and washing, filling and sludge tanks, is installed in the boiler room with pipe lines and drops running to every engine stall. Electric current for light and power is obtained from a local hydro-electric company at 11,000 volts and is stepped down to 440 volts for use in the shop.

Further terminal development in Columbus includes a modern coaling station, an inspection pit and a rearrangement of the freight yard.

The facilities just completed were designed by and erected under the supervision of the engineering department of the Central of Georgia, C. K. Lawrence, chief engineer and W. H. Fetner, superintendent of motive power, with the writer as resident engineer. The general contractor on the work was the George B. Swift Company, Chicago.

Excessive Cost of the National Shop Agreement

Mr. Cuyler Answers Critics Who Doubt Statements Concerning This Inheritance from Government

REPLYING to questions from W. H. Chandler, president of the National Industrial Traffic League, Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, has issued a statement explaining the effect of the "national agreements" with employes, during federal control, on the revenues of the railroads, and disputing some statements made by Walker D. Hines, former director general of railroads. Referring to Mr. Hines's testimony before the Interstate Commerce Commission on January 31, where he said that practically every feature of the shop crafts agreement . . . had been in effect throughout 1919 and had been put in effect in the summer of 1918, Mr. Cuyler says that "some of the most burdensome and injurious interpretations of the provisions of this agreement were never experienced by the director general. These interpretations were largely handed down by Railway Board of Adjustment No. 2, and numerous decisions were rendered in May, June, July, August, and even up to November, 1920."

As to the claim that the classification of labor complained of in the national agreement with the shop crafts had been put in effect in the summer of 1918 and was in effect all during 1919 and could therefore have had no effect upon the operating expenses of 1920, Mr. Cuyler says that one of the most notorious examples of the national agreement, the application of the division of labor to renewing stay-bolts, was not even raised until the case of Engine 1610 of the Baltimore & Ohio on December 6, 1919, less than three months before the termination of Federal control.

The rest of Mr. Cuyler's statement, slightly abridged, is as follows:

Formerly a machinist stripped the locomotive and the boiler makers renewed the stay-bolts. On the occasion in question the shop committee insisted that under the national agreement the following forms of skilled labor must be used:

(1) Pipe fitter and helper to remove injector and other pipes; (2) Machinist and helper to remove injector. (3) Sheet iron worker and helper to remove jacket. (4) Carpenter to remove lagging and running boards. (5) Boiler makers to remove and renew stay-bolts. (6) Engine restored to operating condition by reverse of first four processes.

Yet during 1920 I am informed this became the *standard practice* for the renewal of stay-bolts on all railroads subject to the National Agreement! That the director general did not experience anything like the full force and effect of the rules of the national agreements, will appear from the following decisions of Railway Board of Adjustment No. 2:

Docket 1516, June 18, 1920, prohibiting section men from removing damaged or broken parts of motor cars. Docket 1500, June 15, 1920, prohibiting machinists taking off electric headlights. Docket 1778, September 2, 1920, requiring that as long as employees are required to perform any work in a carpenter locomotive gang, they must be paid continuously at the highest rate of pay. Docket 1678, August 19, 1920, providing that a freight car repairer who occasionally works on passenger cars must be paid the highest rate of pay continuously. Docket 1477, May 24, 1920, providing that a machinist must be paid overtime when transferring from a night to a day shift, even if to meet his own convenience.

On page 3745 Mr. Hines says, concerning features of the agreement which were established for the first time in 1919, "there were numerous railroads which had practically all those features in their agreement prior to federal control." It is true that under threat of a strike in 1917 a certain group of Southeastern railways entered into a so-called Southeastern agreement; and this agreement may be considered as the logical predecessor of the national agreement covering the shop crafts. It is equally true that the constructions placed upon those rules by the U. S. R. A. and its boards of adjustment had in large degree never been placed upon them prior to federal control. . . . Even the Southeastern agreement did not abolish piece-work.

When the railroads were returned, on March 1, 1920, they had approximately 261,000 more employes than they had in December, 1917. Of this increase 221,576 is accounted for in shop crafts, clerks, section hands and unskilled laborers. The railroads moved the abnormal traffic of 1920 with no increase in train service employes; but they inherited a 47 per cent increase in the shop crafts, a 29 per cent increase in clerks, and about a 7½ per cent increase in maintenance employes.

It is true that the railroads cannot make an exact computation on each and every railroad of the effect of every rule in each of the national agreements, and of every interpretation; but it is our belief that between excessive increases in employes covered by these rules and decreases in the productivity per man, the estimate of their having added $300,000,000 to the operating expenses of 1920 is conservative.

It is also undoubtedly true that during 1921, with widespread unemployment and diminished railway forces, the psychological effect made for an increase in productivity and for a curbing of the effort to put further strained constructions upon these rules.

I have no doubt that during 1921 the railroads recovered some considerable portion of the $300,000,000 excessive burden of 1920, and that the effect of this recovery is included in the approximately $600,000,000 of net earnings which the roads will probably show for the year 1921.

At the same time I call to your attention that when the Railroad Labor Board announced its revision of the shop crafts agreement, it informally estimated that this revision would probably enable the railroads to save $300,000,000. . . . We do not believe this to be true, because while the Labor Board made a number of changes which will undoubtedly make for further economy, it left so substantial a portion of the national agreement with the shop crafts that a saving of $300,000,000 would be impossible unless our original estimate of the cost of the national agreements was far too conservative.

Freight Transportation in New England

AT THE JOINT MEETING of the Boston sections of the American Society of Mechanical Engineers, the American Society of Civil Engineers and the American Institute of Electrical Engineers, held on February 15, the subject of freight transportation in New England and its relation to motor transport was discussed by Gerrit Fort, vice-president in charge of traffic, Boston & Maine, and B. F. Fitch of the Motor Terminals Company. Mr. Fort applied himself to the consideration of existing road motor truck competition, whereas Mr. Fitch spoke on the advantages to be anticipated from the use of unit containers in connection with railways, motor trucks or interurban electric lines, considering all means of transport as a whole.

Motor Trucks and the Railways

Mr. Fort directed attention to the fact that with the exception of the Bangor & Aroostook all railroads in New England showed a deficit for the past year. This was brought about by the high operating expenses, for which the high cost of labor was very largely responsible, coupled with the great decrease in business. With the determination of wages, working conditions, etc., in the hands of the Railway Labor Board and the fixing of rates under the jurisdiction of the Interstate Commerce Commission, it has not been possible for the railways to adjust, of themselves, their revenues and expenses to make ends meet. These restrictions have prevented the railways from adjusting themselves readily to new conditions and have made it impossible for them to meet adequately the motor truck competition. They are not able to "merchandise" their product—transportation—as other industries or merchants do in times of depression and thus increase their revenues. There are no opportunities for bargain sales.

Motor transport by road has its greatest field in the densely populated industrial territories. Thus New England has been a fertile field for the development of this mode of freight transportation and it has hit the railways hard. It received a great impetus during the war when the abnormal demands for transportation were such as to exceed the capacity of the railways for prompt handling.

The motor truck manufacturers were not slow to seize this opportunity. What the actual cost of this mode of transportation amounts to, it has not been possible to determine but it is known that the motor transport companies are charging in the way of rates whatever the traffic will bear and that they are free to adjust their rates either up or down without the interference of any regulatory bodies. In this way they have a great advantage over the railways. In fact there is no regulation between the motor companies themselves.

The question has been asked whether or not it is profitable for the railways to handle l.c.l. freight and if it is not, why not turn it over to the motor trucks. In times of heavy business when a large amount of car load freight is offered, it would undoubtedly be better for the railways to let the motor trucks handle such business, but on the other hand in dull times the railways need the revenue from the l.c.l. shipments to help meet the overhead expenses. Another distinct advantage enjoyed by the motor truck is that it does not begin to pay for its share of highway maintenance or improvements, while the railway is called upon not only to maintain its own roadway at its own expense but to contribute, by means of taxes, to the maintenance of the highways which the motor trucks use.

Mr. Fort believes that highway motor traffic has come to stay and that for short hauls it has a distinct place in the transportation system of the country, but it should not be allowed to compete unfairly with the railways. The motor truck companies acting as common carriers should be made to pay their fair share of highway maintenance and be subjected to the control of either state commissions or the Interstate Commerce Commission the same as the railways. He believes that the present short haul rail railroad rates should be reduced as soon as business improves or expenses can be reduced. He believes that the motor truck is an economic factor in transportation that should be used to supplement the service of the railways and be developed to co-ordinate with them.

Unit Container Meets New England Conditions

Mr. Fitch explained at some length the service rendered by the unit container for l.c.l. freight at Cincinnati where it has been used with success in linking up the 28 scattered freight houses of all the railways and believed that what had been done there in a small way could be done in a larger way in New England.

He proposed the establishment of transfer stations at the frontiers of the New England territory, such as Albany, Poughkeepsie, Harlem, etc., where all inbound l.c.l. freight should be loaded into containers for individual New England line station destinations or the principal volume consignees. Such containers would then be available for movement by motor truck, interurban car, float or railway car, whichever would offer the most economic operation.

If at such suggested frontier transfers all l.c.l. eastbound shipments destined into New England could be transhandled to containers and flexibly delivered by any of the existing mediums of transportation throughout this territory, maximum economies could be effected. The cars unloaded at transfers would be immediately available for westbound reloading, and thus the New England territory, which has been termed a graveyard for box cars, would receive and forward in box cars without transfer only carload shipments, all less than car lots being handled in containers between transfers and industries.

"This program in my estimation," said Mr. Fitch, "will save the per diem charges of foreign cars now paid by New England roads, will decrease labor rehandling costs, increase the ton-mile efficiency of such roads and expedite the movement of freight. As I see the entire New England situation, the problem is first one of co-operation for development of a program permitting maximum use of existing plant of all interests.

Now you all suffer and are paying for the cost of interrupted movements, which causes congestion with its accruing evils and expense, whereas if a co-ordinated system permitting a free and steady flow over existing rails and through existing terminals is developed, your traffic capabilities are unlimited and your cost assessment for additional facilities will be nil."

NEW YORK CENTRAL.—*Stockholders Approve Lease.*—At a special meeting on February 3 the stockholders approved the proposals of the directors to lease the Toledo & Ohio Central and other railroads. The company filed application with the Interstate Commerce Commission last December for authority to make the leases.

Modern Methods of Handling Package Freight*

Remarkable Savings Have Been Made on the New Haven by the Use of Tractors and Trailers in Freight Houses

By G. Marks
Assistant to General Manager, New York, New Haven & Hartford

MODERN HANDLING of package freight is a real problem. It is a vital factor in prompt dispatch and low transportation cost. Two marked and important innovations have been the deciding factors in securing greater efficiency and economy in the handling of package freight through freight houses:

First: The installation of mechanical equipment through the substitution of electric tractors and trailer trucks for hand-operated two-wheel trucks.

Second: The introduction of cost or performance sheets showing concisely and accurately, the three fundamental features of freight house operation; *total cost* (man-hours and money), *total tonnage,* and *cost per ton.*

Electric Tractors and Trailer Trucks

In order to show the value of the tractor with trailer trucks, it is desirable to call attention first to the so-called "gang system" of handling freight, which is the plan, with but few exceptions, almost universally followed in the East even now, and also the "drop truck system."

The "gang system" involves at least two distinct operations, and often three, as well as much lost motion through the necessity of pushing the freight back to clear the doorways. It increases the possibilities of damage to freight, also splitting of shipments. There is also a decided disadvantage through delay to outward billing, as shipping orders cannot be sent to the billing department until after the final check by the tallyman. Under this system a trucker must make a round trip from the checker to the car and return to the checker. The return movement is unprofitable in that the trucker is not moving any freight, merely pushing an empty truck.

By the introduction of the so-called "drop-truck system," with 4-wheel trucks. manually operated, the first economies were made possible through the elimination of one or two of the three operations previously mentioned. Under this plan, a supply of trucks is placed adjacent to the receiving doorways, enabling teamsters to unload their outbound freight direct to the truck, thus keeping the freight, excepting large and heavy packages, entirely off the freight house floor and almost entirely eliminating the need for the so-called doormen or push-backs. The use of 4-wheel trucks, manually operated, under the "drop-truck" system, effected a partial improvement toward speedier operation as compared with the gang system, but it was still impossible during the peak hours to move the freight as rapidly as offered.

By replacing the 4-wheel trucks, manually operated, with trailer trucks, hauled by electric tractors, it has been definitely shown that rush hours can be protected and the actual loading kept abreast of the receipts, so that at the close of the day, the quantity of freight remaining unloaded is reduced to a minimum. Aside from the loading of practically all freight on the same day offered, it has had the effect of expediting the unloading of freight from the dray and obviating the necessity of the drivers and helpers carrying the freight to any available vacant space on the freight house floor, thereby releasing teams in much less time than was possible under the gang system.

*Abstract of a paper presented before the New England Railroad Club, February 14, 1922.

We have operated under the 2-wheel hand truck by gangs; then the 4-wheel truck, manually operated under the "drop-truck" system, and finally under the tractor and trailer system and thus have an intimate knowledge of the results obtainable under all three systems.

Original advocates of tractor operation were firmly of the opinion that a certain hauling distance was essential—I believe 300 ft.—if any decided economy was to be effected, yet this theory has been disproved by practical experience with tractor operation at the New Haven outbound houses in Boston. With designated doorways for the receipt of the freight, practically opposite assigned cars, affording a hauling distance rarely exceeding 150 ft. and averaging but 85 ft., it has been proved that tractors can be most successfully operated regardless of distance.

A most decided advantage in favor of the tractor-trailer is the saving in the number of men, thereby reducing the incidental congestion and confusion with its consequent delay to the hand trucker, also the savings resulting from reduced labor costs. Let me give you some actual figures. At Westchester Transfer, prior to July, 1920 (the date on which it was closed and the new transfer at Cedar Hill opened), the maximum capacity was 25 gangs or approximately 150 men. To exceed this number was unprofitable, as a congestion was created without any resultant increase in performance. Westchester had three platforms, all 1,200 ft. long; two 14 ft. wide, and one, the center, 16 ft. wide. Its peak day averaged between 100 and 125 cars. Yet at Cedar Hill with the same number of platforms, also 1,200 ft. long, two being 20 ft. wide and one 30 ft. wide, using from 12 to 16 tractors with 600 trailing units, and approximately 200 men, three times the number of cars can be worked, as an average of from 300 to 350 cars daily can be handled. With the tractor and trailer, the man movement is restricted to the loading of the trailers at the car being worked and to the unloading of the trailer at its designated block or car by stevedores, the intermediate move being handled by the tractor. Of these 200 men at Cedar Hill, only 32 are required to operate the tractors or ride the trailers, the others being held to a working radius of the car being unloaded or stowed. Due consideration should also be given to the fact that Westchester Transfer operated on a ten-hour basis while Cedar Hill is a straight eight-hour plant.

Our experience is that the trailer equipment should include 15 in. diameter 4-wheel trailers for ordinary compact package freight, with 11 in., or dolly, 4-wheel trailers for hauling machinery, pianos, and similar freight. Fifty 3-wheel trailing trucks, specially adapted to handling heavy package and barrel freight, have just been installed at Cedar Hill, and with these three styles of trailers, the use of the hand truck is practically eliminated, thus giving approximately a 100 per cent tractor-trailer operation.

The tractor crew usually consists of two men—the driver and a helper. The former operates the machine while his helper makes the hitches and lines up the trailers in series according to car location; rides on the rear trailer and upon arrival at the designated cars uncouples the trailers and leaves them for subsequent handling by the stevedores.

The use of tractors requires a charging plant. The neces-

sary maintenance and minor repairs are handled by an electrician working during the night period who thus gives the trucks daily inspection and attention.

It has been found that the best results from tractor-trailer operation are obtainable only through as close as possible to 100 per cent use of both. The trial of a single unit, when the tonnage handled warrants several such units, does not show up advantageously as the slower work of the hand truck, still retained, interferes with the operation of the tractor.

Whether trailers are hauled directly into cars, pushed in, or left opposite car doors (dependent upon local physical conditions), the actual unloading of the trailer and the stowage of the freight is performed by stevedores assigned to permanent locations who are familiar with the existing loading instructions. In no case is the tractor and its crew detained or held, while trailers are being either loaded or unloaded. The hauling tractor functions usually in both directions, but when no loads are available, empties are moved back to places where they are needed. The distribution of empty trailers is handled by one man who acts in the capacity of car distributor.

Cost or Performance Sheets

To maintain a proper check upon the entire operation of any freight station it is necessary that two distinct divisions of cost be maintained:

First: The freight house force, including all who are actually engaged in the handling of freight through the freight house (watchmen, foremen's clerks, sealers, coopers, sweepers, etc., who, while they may not actually handle freight, yet are essential parts of the freight house organization).

Second: The office force, including those who confine their duties to the freight office and routine work incidental thereto.

Each report should contain a classification of employees by occupations, sub-divided departmentally and the sum total of the expense shown on the two reports should equal the actual payroll total, thus affording an excellent check of performance against the payroll.

The freight house sheet should show the actual hours worked by, and the money paid to each employee, or employees, by classes; the total tonnage handled, subdivided between "forwarded," "received," and "transfer," with but one credit for the same tonnage, regardless of the number of times local conditions require the handling of such tonnage, and without allowance for that tonnage, which, for any reason, is left in the same car and not transferred.

Certain deductions from the payroll total are permissible, as not being chargeable to the actual handling of house freight; such as the use of the house forces for transferring the contents of defect cars; unloading coal for the engine house; or feeding a car of livestock. These deductions should be totaled and shown in a space specially provided with full details of each deduction.

The daily performance record is of first value to the agent, who can thereby gage his forces, day by day, keeping them in proportion with the business offered. Supplementing the daily record, a weekly summary, showing comparative costs for the preceding week, month and year, sent to divisional supervisors, keeps the latter in close touch with each station.

A monthly summary establishes an average daily cost comparison between all stations handling an appreciable amount of tonnage, while the grand summary for a division, district or the entire system affords a true basis for comparison and possible improved operation as well as showing the average cost and performance for all stations combined.

The combination of mechanical operation, tractors and trailers, with up-to-date cost and performance sheets, indicating *tons handled per man per eight hours*, enables an agent to obtain and maintain efficient and economical operation, for by keeping in touch with the cost figures, he can regulate his force as the business increases or decreases day by day.

The results obtainable by present methods versus the old are best shown by a brief statement of the actual experience at the four stations on the New Haven (New York Piers 37 to 42, East River; Cedar Hill Transfer, Providence and Boston), where the tractor-trailer system is now operative.

Pier 39.—In April, 1918, prior to the installation of tractors and trailers, the tonnage handled per man per eight-hour day was 4.4 tons, to be exact 4.408, while in April, 1921, with tractors and trailers, the performance increased to over 9 tons, the exact figures being 9.023, an increase of 4.615 tons or 104 per cent. In other words, the performance doubled itself, creating a saving in handling cost of approximately $100,000 per year.

Incidentally, during the war period, tractor and trailer operation permitted the New Haven to keep its piers open for outward, and free from embargo on inward, business.

Providence.—The tonnage handled per man per eight-hour day increased from 4.138 in May, 1918, to 7.163 in May, 1921, a net increase of 3.025 tons or 73 per cent. Providence handles both its transfer and outward tonnage with tractors and trailers. The cost per ton was first reduced 10 cents under the "drop truck" system (4-wheel trucks, manually operated) as compared with 2-wheel trucks under the gang system. This saving was equivalent to approximately $25,000 per year. The cost per ton was further reduced 15 cents through the installation of tractors and trailers, with an additional saving of approximately $37,500, or a combined saving in excess of $60,000 per year over the 2-wheel truck operation.

Boston.—At Boston, with its shorter haul to the cars, no transfer freight to be handled, and both "drop-truck" and tractor-trailer operation confined to the handling of outward tonnage only, six cents per ton were saved through the original installation of 4-wheel manually operated trucks, while an additional saving of eight cents per ton has resulted through the installation of the tractor and trailer. Comparing July, 1919, prior to the use of drop-truck, with December, 1921, under tractor and trailer operation, the annual saving attributable to the latter approximates $75,000.

Considering the cost at these three stations mentioned above prior to the introduction of any form of drop truck, and the present cost with both tractor and trailer, the handling cost has been reduced between 14 and 25 cents per ton. This is due directly to the mechanical equipment. Furthermore, it has been possible to save, within a period of from eight to ten months, an amount equivalent to the entire cost of the installation.

Cedar Hill.—The money saved in the actual handling of the freight is not the only thing to be considered. At the present time business conditions require the purchase of goods in less-than-carload lots. Speedier service from manufacturer to consumer is demanded. Competition with the motor truck must be met; hence, it is imperative that freight move to the greatest practicable extent in "direct-to-destination" cars, thus eliminating all possible delay incident to intermediate and smaller transfer stations. Economical train operation, reduction in per diem, reduction in freight loss and damage costs, require the use of as few cars as possible and all features crystallize in the need of a centralized transfer point, where the greatest number of classifications, or direct cars, can be made.

With this thought in mind, Cedar Hill Transfer on the New Haven was opened in July, 1920. It was initially supplied with 9 tractors and 350 trailers, but this equipment has been increased to 16 tractors and 600 trailers. A record of 2,836 tons has been handled in one day, while 350 cars can be regularly worked and freight transferred into approximately 280 cars in the outbound classifications.

Factors in the Business of Owning Locomotives*

Motive Power and Operating Departments Must Work Together in Design and Operation to Secure Economy

By C. B. Peck
Western Mechanical Editor, *Railway Age*

IN SETTING BEFORE YOU tonight what I conceive to be a few of the important business angles of locomotive policy, my purpose is not that of an exhaustive treatment but merely to suggest something of the relationships which matters within widely different jurisdictions bear to each other in their final effect on the well being of the railroad.

In discussing the ownership and operation of locomotives as a business proposition rather than from the technical viewpoint, it may be pertinent to consider for a moment who owns the locomotives. "The railroad, of course," you say. But the railroad is sharply restricted in its enjoyment of its property by public regulation and if we consider the locomotive as a producer of gross ton miles rather than as an end in itself, a part of the responsibility for expensive service should be placed squarely on the shoulders of the public. Indeed the burden is there now, but there is not a realization of its cause.

Purchasing Policy

The first business relating to the ownership of locomotives is their purchase. The question of what policy should be adopted by railway managements with respect to the acquisition of motive power is an exceedingly difficult one to discuss. Simple as the fundamental principles may appear to be, their application is affected by many variables the relative weight of which must at best be determined on the basis of very meager knowledge. For instance, if a heavy investment in equipment is to be made during a period of heavy traffic in order that the public demand for transportation may be met, just what assurance has the management that the crest of the wave of heavy business may not have passed before the equipment is delivered? If such be the case, what effect is the burden of the added fixed charges likely to have on the financial safety of the corporation until the next period in which the new investment has an opportunity to develop its full earning capacity? Again, with public regulation limiting the maximum return on railway capital to 6 per cent, and then taking care to see that on the average the maximum shall not be reached, what likelihood is there that the credit of the roads will more than meet the need for the additional facilities constantly demanded by the steady industrial and commercial expansion of the country?

With these reservations, then, it may not be out of place to suggest that the ideal purchasing policy is one in which, not locomotives, but locomotive service is the objective. In other words not the lowest price but the least cost per 1,000 gross ton miles or per passenger car mile during the life of the locomotive should be the aim of the management.

The five items of direct cost of freight train operation per 1,000 gross ton miles for the Class I roads during the first 11 months of 1921 averaged $1,254. Interest on investment and depreciation charges for the same unit of service approximated a total of 7½ cents. The relative importance of locomotive price and operating costs is clearly indicated by these figures. The direct items of unit cost of train operation are given in detail in the table.

Economics and Design

In preparing for the purchase of new motive power the mechanical department has one of the best opportunities that could possibly be offered to go into the whole vast field of the economics of railway operation. Even the detail mechanical design cannot be settled on the basis of sound judgment until the designer has at his command a thorough knowledge of the limitations of operating and maintenance facilities and a sound appreciation of the relation of the cost of maintaining each group of the details to the total cost of locomotive maintenance. How many roads know the relative cost of maintenance per locomotive mile of locomotives of different classes now in service, and can tell whether the differences are due to the boiler, the rods, cylinder conditions, valve motion, frames or driving boxes? Also whether the differences develop in the back shop or in running repairs? The results of a study of this nature would be tremendously valuable to the designer in his selection of details. One year's saving in maintenance on an order of 50 locomotives, after they had begun to come through for classified repairs would probably defray the entire cost of the study and a sound basis would be established for the rapid elimination from the standards of the road of the undesirable designs. Serious defects of design, tending to cause failures or leading to marked inconvenience in the roundhouse or shop are readily caught. But there are still big possibilities for the exercise of judgment within the range of safe and apparently satisfactory designs. Judgment is nothing but guess work unless founded on fact.

ELEMENTS OF THE UNIT COST OF FREIGHT TRAIN OPERATION

	Cost per 1,000 gross ton-miles
Fuel	$0.405
Crew wages	.378
Locomotive repairs	.312
Train and engine supplies	.083
Engine house expense	.076
Total	$1.254
Investment charges (estimated)—	
Interest on investment	$0.050
Depreciation and retirements	.025
	$0.075

But at the outset the designer has even a broader survey to make—one involving almost every item of direct train operating cost, as well as the investment charges. The limits of weight and tractive effort are generally fixed by conditions outside of the locomotive itself, such as strength of bridges, standards of track maintenance, etc. Within these limits, of course, increasing the capacity of the locomotive decreases the unit cost of crew wages and to a less extent the fuel bill. The cost of maintenance is almost as large as crew wages and increasing the size of the locomotive may materially increase this item of expense if the working loads on the running gear become excessive, or if the size of the locomotive outgrows the facilities for its maintenance. Unit investment charges may also be adversely affected if outgrown shop and terminal facilities lead to a marked reduction in the yearly mileage of the motive power.

The big problem, however, is to determine how much shall be added to the pound price of the bare locomotive for those items of equipment that will increase its capacity without materially increased weight, or will decrease one or more of the important items of unit operating cost.

It is not the purpose of this paper to enter into a detail

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discussion of the possibilities of this growing group of devices; they are known to be large by executives as well as by mechanical department officers. Suffice it is to say that no road need be without reasonably accurate knowledge of the relative importance of each of the factors in its direct train operating costs, and that the final decision as to the selection of such devices should be based on their probable effect on the sum of the cost of fuel, crew wages, locomotive repairs and the investment charges. Of this sum the latter form a very small part, but I fear that they are too frequently the sole factor considered.

Utilization and Maintenance

An analysis of the operating statistics compiled by the Interstate Commerce Commission for the period from 1903 to 1913 inclusive, has developed the fact although there was a marked improvement during that period in the extent to which the potential hauling capacity of freight locomotives was utilized, there was actually a steady decline in the total yearly traffic movement obtained from each unit of hauling capacity. The average train load had increased more than the tractive effort of the average freight locomotive, but the average number of train miles made by each locomotive in a year showed a marked decline. Continuing the comparison, the tremendous increase in traffic which reached its maximum in 1918, led to a big increase in the actual volume of traffic moved by each unit of tractive effort. But this was obtained entirely by increasing the train load, the average train mileage per locomotive per year remaining practically the same as in 1913. In 1920, the record year for volume of traffic, the same conditions continued.

What does this mean? In the first place it shows that the extent of utilization of the capacity of the locomotive when it actually moved, has been greatly increased, with large decreases in the crew time, fuel consumption, cost of train and engine supplies and the enginehouse expense per unit of traffic moved. But the average number of train miles per locomotive has declined from about 22,000 in 1903 to about 18,000 in the high years 1917 and 1920. This decline is equivalent to a loss of two months a year of the kind of service rendered in 1903. To restore the former conditions would mean that ⅙ of the present investment in locomotives could be released for productive use in providing other much needed facilities.

There are several causes for this marked decline in locomotive mileage, not all of which are under the control of the managements. One of the latter, for instance, is the effect of the locomotive inspection law. But it is pertinent to note that the number of locomotives has increased more than 50 per cent during the 17 years under consideration, and the average hauling capacity has increased between 65 to 70 per cent. In other words, there is at least 2½ times as much locomotive hauling capacity to be maintained as there was in 1903, and some of this capacity probably requires more attention per tractive effort unit than did the average unit of the earlier period. The meager expansion of shop and engine terminal facilities which has taken place during the same period certainly has been far from adequate to care for this great increase in motive power and it seems probable that this is one of the largest, if not the largest single cause of the decrease in train miles per locomotive.

Longer Runs

The distribution of locomotive hours published by the Railroad Administration indicates that the average serviceable locomotive spends not more than 40 per cent of its time on the road, and a little over 50 per cent at the roundhouse. These figures reflect the effect of the short operating district, averaging approximately 100 miles in length, which is so strongly entrenched in American railroad practice.

There are instances where it has long been the practice to operate passenger locomotives over two freight engine districts, with or without a change of crews, and in several cases increased passenger engine runs have recently been established. On the Missouri, Kansas and Texas, after several months' experience with passenger locomotives operated continuously a distance of 400 miles, the distance was increased on one run to 672 miles, with the result that three locomotives were doing the work which five were formerly required to do. In this case the locomotives are operating in oil burning territory, which, of course, eliminates one of the greatest difficulties in the way of long engine runs, i. e., the maintenance of a good fire without detaching the locomotive and running it over a cinder pit to clean the fire en route. Some experimenting has also been done in increasing the length of freight locomotive runs with very promising results, but this work has not yet reached the point where any general conclusions can safely be drawn from it.

What are the possibilities of long runs? Taking the country as a whole about 10.5 hours are spent on the road and 13.5 hours either in the terminal or at the roundhouse out of each 24 serviceable locomotive hours. Doubling the length of the run would probably have little effect on the average number of terminal hours per trip, but would double the hours on the road. Then instead of 10.5 hours out of each 24 serviceable hours an average of 14.6 hours of actual service would be obtained. This is an increase of about 40 per cent. Putting it differently, for each 10.5 locomotive hours actually required in moving trains there would be 6.75 hours in terminals instead of 13.5 hours, a reduction from a total of 24 to 17.25, or 28 per cent. Eventually, but not immediately, this would mean a 28 per cent reduction in investment charges per unit of service. If the fires do not require cleaning enroute it would reduce the engine house expense per unit of service by 50 per cent. The cost of repairs would not necessarily increase; indeed the closer attention to running repairs required to insure against engine failures would tend to prolong the mileage of the locomotive between classified repairs.

Where locomotives are now operating in assigned service, increasing the length of runs may lead to much less satisfactory maintenance conditions, since it will tend to create pooling conditions with a loss of interest in the upkeep of the locomotives by the crews. This will have to be paid for at the terminals in increased inspection or the plan is likely to prove a failure at the outset.

Wherever a general extension of locomotive runs proves to be practicable an opportunity is offered for the concentration of work at the better equipped terminals. On the development of these terminals future appropriations may be concentrated, with much more effective results than would follow the wider distribution of the same amount of capital over the additional number of intermediate terminals.

Dispatching

The locomotive, like any other machine, has its limitations. Failure to respect these limitations inevitably leads to increased operating costs. Any machine gives the best results when subjected to steady and constant use, following as nearly as possible a fixed routine. In the case of the locomotive this would require dispatching after a fixed minimum period in the hands of the mechanical department with a full tonnage train movement over the division without delay on a regular schedule of running time, followed by the delivery of the train and the return to the mechanical department without terminal delay at the terminal. It is, of course, unnecessary to call attention to the effect of delays, either road or terminal, in increasing crew overtime, and fuel consumption. Nor does it need much argument to convince any mechanical department officer that excessive delays greatly increase the amount of boiler work. Here, the business of locomotive operation comes in vital contact with transportation yard

facilities and passing tracks, on the adequacy or inadequacy of which depends the possibility of obtaining ideal locomotive operating conditions.

But there is another possibility for stabilizing locomotive operation, that does not involve the question of capital expenditure for other facilities. That is the possibility for organizing freight train movement on the basis of regularly scheduled dispatchings, so fixed as to smooth out the load on tracks, yards and engine terminals. The common practice of fleeting trains over the road overloads the passing track facilities on single track lines, thus causing excessive road delays. It chokes terminal yards, which are excessively busy for comparatively short periods followed by longer periods of idleness, and throws a load on the engine terminal that results in long delays to locomotives under steam, short time for repairs, delay in dispatching and engine failures. These overloads increase the unit cost of yard operation, train crew wages, engine house expense and, through neglect of defects in the early stages of their development, inevitably lead to increased maintenance expenditures. Of course certain classes of traffic demand a service that leaves no choice as to how or when the trains shall be moved. But the great bulk of traffic on American railroads can be started on its way at 10, 12 or 2 o'clock as well as at 6 o'clock.

Maintenance

For the first 11 months of 1921 the combined cost of locomotive repairs and engine house expense per 1,000 gross ton miles on the Class I railways slightly exceeded the cost of train and engine crew time, and was only a little less than the cost of fuel. These two accounts, the sum of which is tremendously influenced by the character of shop and engine terminal facilities, are therefore among the three principal items of direct cost of train operation.

Two railroads operating in the same region, through country of much the same nature, handle practically the same character of traffic in about the same average train loads, both passenger and freight. With the exception of enginehouse expense and locomotive maintenance, the unit costs of train operation on the two roads differ but slightly. Over a period of four years' enginehouse expense on Road A averaged 5.5 cents a train mile, and on Road B, 7.3 cents a train mile. Locomotive repairs cost Road A 17 cents a train mile and Road B 26.9 cents a train mile. Road A gets about 40 per cent more train miles a year from each locomotive owned than does Road B. Shop and engine terminal facilities on Road A are considerably above the average; those on Road B, particularly its back shop facilities, are much below the average.

On the business handled during the four years the above difference in the rate of expenditure on these two accounts cost Road B an average of about $2,300,000 a year. Assuming that half of this difference is brought about by causes which increased and improved facilities could not remove, the saving of the remainder would justify a capital expenditure of over $9,000,000 on the basis of a 12½ per cent return—certainly liberal enough to be attractive even in these days of high interest rates. The book value of this road is approximately $400,000,000, and it is doubtful whether the value of all shops, engine terminals and shop facilities for the care of both the cars and the locomotives exceeds $16,000,000.

Capital Expenditure

But before passing final judgment on the managements of these two roads one other comparison should be made. Road A has a history of extremely conservative financing which places its present management in a position of security; the sheriff has his eye on Road B. Road A is considerably above the average in its ability to accumulate a surplus; Road B's situation is fairly typical of the situation with which the greater part of the railroads in the United States are confronted today.

With these facts in mind let us try to answer the question, "Where would Road B get $9,000,000, or half of that amount, to provide additional shop and terminal facilities?" "But," you say, "the prospect of a saving in operating expenses equal to a return of 12½ per cent, possibly even larger, ought to be attractive enough?" Undoubtedly it is attractive enough to the management of Road B, but put yourself in the place of the investor a moment and remember that your bonds will not alone enjoy the security of the high earning capacity of the capital you furnish, but that they will have to share it with most of the securities already outstanding. Furthermore, how confident would you feel that the public would not relieve the railroad of its 3 or 4 per cent of the return, with which it hopes to build up its surplus, long before the maturity of your bonds, leaving you with a depreciated security on your hands? Would you take the risk?

It is not difficult to understand why the credit of the railroads narrowly restricts the amount of new capital they are able to raise. And generally speaking, the managements have little choice as to how they shall spend it. Daniel Willard, president of the Baltimore & Ohio, in his testimony before the Interstate Commerce Committee of the United States Senate during the railroad inquiry last May, clearly defined this problem as follows:

"Is it desirable to spend at this time for new shops $2,000,000, which sum is available and which sum would enable it to repair its locomotives at a lesser cost, or should the money be used for the purchase of new steel coaches which will mean no economy in operation, but on the contrary mean an increased cost of transportation because of the greater weight of the steel equipment?

"It was decided," said Mr. Willard, "that the public in this instance would be better served by spending the money available for steel coaches rather than for new shops, inasmuch as it was possible to maintain the motive power in the existing shops."

The demands of the public for increased service require a constant expansion of certain facilities such as industrial tracks, cars and locomotives. Unless funds are still available after these demands have been met how can the management make the much needed investments in facilities such as new shops and enginehouses, which offer opportunities for tremendous economies in operating costs, but which will not take the place of cars and locomotive in actually moving the business?

The public is in control of the railroads' revenues. It controls over half of their expenses. The greatest field for economy beyond the scope of public regulation requires capital expenditure. But the ability of the roads to raise capital depends on their credit, and their credit is largely determined by the relation between their revenues and expenses. Who, then, is responsible for the waste resulting from the use of obsolete and outgrown facilities? The railroads or the public? In my opinion, in the long run the public will pay dearly for its covetous attitude toward its railroads.

The question of back shop expansion is somewhat different from that of engine terminal expansion. In the latter case the necessities of location and service leave little question as to who shall provide the capital. The need for additional back shop space may, however, be met outside of the railroad. While the opportunities for contracting locomotive repairs are not as numerous as in the case of cars the possibilities of utilizing shop space in certain industries during slack times, for locomotive repairs might be developed to very great advantage, thus postponing the time when back shop extensions would become compulsory. If sufficient capacity were available in outside shops, the railroads might be money ahead by depending on them for future growth, thus conserving their credit and at the same time getting the bene-

fit of real business management in the cost of part of their work. Competition of this kind between the railroad and the contract shop might have a wholesome influence in the development of more businesslike methods of control in the management of the railroad shops.

This statement is not a reflection on the ability of railroad shop managements. The methods of accounting for maintenance expenditures leave them little opportunity for the exercise of good business judgment, and any real improvement in this situation will have to originate with, or have the active support of, the chief operating officer or the executive.

Locomotive Rehabilitation

At the present time we are in an era of intensive locomotive development which has progressed so rapidly that the original construction of probably more than half of the locomotives in service is obsolete. Many of these locomotives already have been through one or more rehabilitation processes to restore them to a status of usefulness comparable with that of the new locomotive of modern construction. What should be done with the remainder?

In answering this question, consideration should be given to the question of capital turnover. The maintenance of equipment accounts include a depreciation and a retirement account for each class of equipment, which I am inclined to believe are not taken seriously enough.

There is no doubt but that a locomotive could be maintained forever in a physical condition averaging say about 60 per cent of its condition when received from the builders. But improvements in the efficiency and effectiveness of locomotives, as well as in the other parts of the railroad machine with which it must function have in the past and probably always will in the future, limit its usefulness to a comparatively short period. In considering the advisability of rehabilitating the old locomotive, which has accumulated a large part of the fund necessary to replace its original value, through the depreciation account, this fact should be kept clearly in mind. Furthermore, the cost of the process of rehabilitation cannot all be capitalized but may involve an abnormally heavy charge to the repair account at the time the work is done and the locomotive, being old, and of small capacity will probably continue to run up heavier unit repair charges than would a new locomotive, modern in design and capacity. It becomes a question, then, whether it would not be cheaper to save the heavy charge to repairs, make the necessary retirement charge and raise new capital for the difference between the book value of the old locomotive and a new one, thereby getting at least a year's service with only nominal repair costs, as well as all the advantages of a modern locomotive in reducing the other train operating costs. With these facts in mind it becomes a matter for serious consideration just how large the depreciation rate should be. Too small it tends to perpetuate obsolete and inefficient power. Too large it may increase the average of the sum of all operating costs. Its correct establishment to best fit the probable future development of each road, is not a matter of mere bookkeeping but a question directly affecting future operating costs.

Conclusion

The few business factors which have been here touched on are, I believe, sufficient to establish the fact that a railroad is an entirety which cannot function as a group of walled-in departments, each sufficient unto itself. Probably each one of the points suggested is better understood by some of you than by me, but if, in attempting to bring them together some phase of the subject not in his immediate view may have become a little more concrete to any one present, I shall have accomplished my purpose. Let no one forget that railroading is a business and that the yard stick of business principles should be applied to every problem, no matter how technical it apparently may be.

Motor Cars on the New Haven

IN THE discussion of F. M. Whyte's paper on "Australia and Its Railways" at the meeting of the New York Railroad Club, February 17, W. L. Bean (N. Y., N. H. & H.), referred to the use of small self-propelled units in place of steam trains where runs are short and traffic light and unremunerative. He pointed out that there are two fields for these cars; short line runs and branch lines of larger roads. The requirements of these two classes of service are different and care should be taken to make sure the equipment is suitable. It is also necessary for railroad officers to understand definitely the limitations of power available in a gasoline engine, which differs from a steam engine and must not be overloaded. For this reason, grade, speed and weight per horsepower must be carefully considered. At this time it is best to keep on the safe side and not overdo the application of internal combustion engines as this might cause a serious setback in the development.

Mr. Bean discussed the operation of the cars which are now in use on the New Haven. The equipment has only been in service since January 3 and it is impossible to state definitely what the results will be in maintenance, depreciation or reliability, but it is felt that it will be satisfactory in these respects. One of the cars is now making two round trips a day on a 15-mile branch, making a schedule speed of 25 miles an hour with three stops. The car has made 1,437 train miles, carrying from 3 to 38 passengers, the average being 21.2 passengers per trip. The average delay has been 1.3 min. per trip. A second car is making 137 miles a day, the schedule varying from 19 to 23 miles an hour, with five to eight stops. It is carrying from 10 to 66 passengers, the average being 27.2 passengers per trip. The average delay has been 1/5 min. per trip. The third car is making 146 miles a day, the schedule varying from 20 to 26 miles an hour, with three to twelve stops. The car covers six separate trips in a day on lines with grades varying from level to 100 feet per mile. It has carried from 10 to 73 passengers. The average delay has been 1.2 min. per trip.

As a result of the experience up to this time, Mr. Bean is confident that very large economies are available by the use of motor cars. The development will no doubt be rapid and should be directed along sound engineering lines to avoid the building of unsatisfactory equipment. He pointed out that standby losses and the cost of coal and ash handling and attendance at terminals must be considered in comparing steam operation with motor trucks as the gasoline-driven equipment will save large amounts in these items of expense.

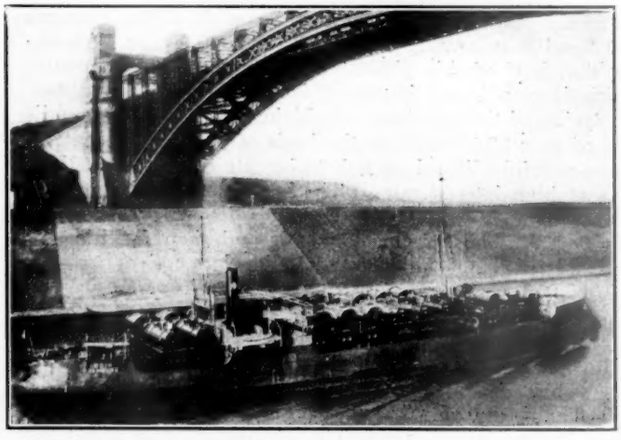
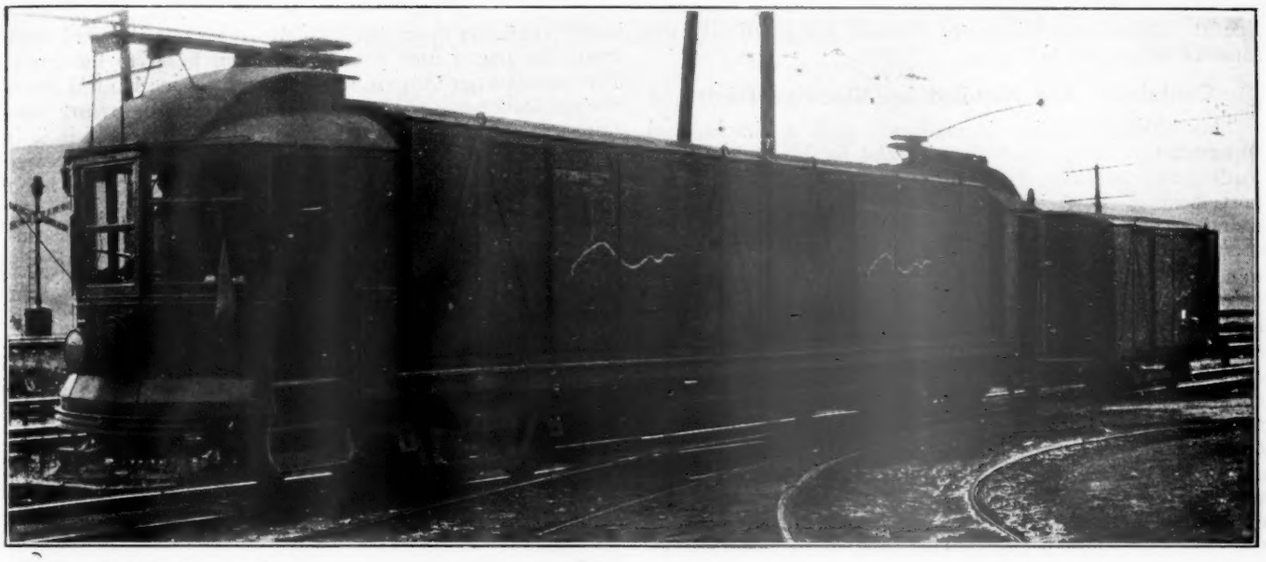


Photo by Kadel & Herbert

German Locomotives for Export Passing Through Kiel Canal on What Was Once a Battleship

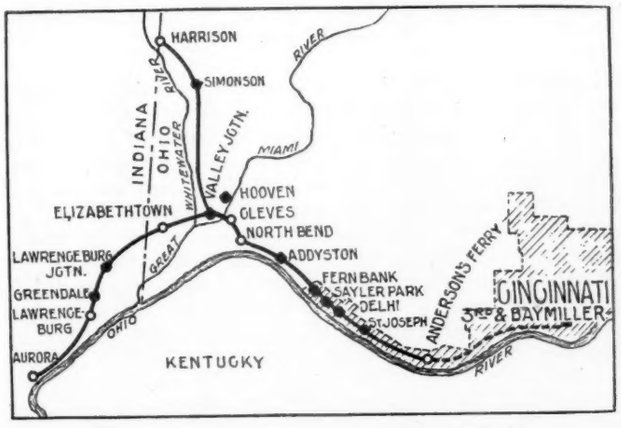


The Three Unit Container Train

Container System Creates Freight Service

Interurban Line Installation at Cincinnati Interesting Because of Relation to Railroad Practices

IN VIEW of the prominence which the subjects of container cars, motor truck haulage, steam line short-haul, etc., have been receiving of late, the experience of the Cincinnati, Lawrenceburg & Aurora, an electric line, should be of interest. By establishing a small, inexpensive off-track station in the downtown part of Cincinnati and inaugurating a demountable body or unit container system in conjunction with motor trucks and flat cars, the road has furnished a freight service that is proving profitable where none at all was furnished previously. The motor truck equipment and service is supplied by the Cincinnati Motors Terminals Company utilizing the same system employed by that company in the interchange of l.c.l steam railroad freight; this system was described on page 219 of the August 6, 1920, issue of the *Railway Age*.



Black Characters Denote Prepay Stations

The Cincinnati, Lawrenceburg & Aurora extends from an outlying point in the city of Cincinnati, known as Anderson's Ferry, to Aurora and Harrison, Ind., a distance of about 30 miles. Anderson's Ferry has been the transfer point for passengers and is now the transfer point for the freight service. The off-track station is located at Third and Baymiller streets in Cincinnati and is equipped for handling demountable containers. Freight is received from and delivered to shippers at this station. The incoming freight is run into containers of 5-ton capacity by hand trucks through end doors and is stowed away in line station order to facilitate quick unloading of individual consignments through the side doors at the various destinations. Lading and way bills are made out at the off-track station for each consignment and an abstract of the shipments in each container is made from the way bills. Outbound shipments are made daily, leaving the station at 12:00 noon, and being delivered at the end of the

Container Ready to Be Removed from Motor Truck Chassis on to Electric Car

line at 3:00 p. m. The rates charged are practically the same as steam railroad rates.

Containers Are Handled by Electric Hoists

This off-track station is equipped with a simple steel superstructure carrying an electric hoist for loading and unloading the containers from the wooden horses used to support them at the freight house to the truck chassis. The container when loaded on a truck is moved to the transfer station at Anderson's Ferry on a scheduled run of 40 minutes, partly through city traffic and over a total distance of 6.1 miles. The off-track unit is arranged at present to handle two container units at one setting.

A similar superstructure with hoist has been installed at Anderson's Ferry, extending over the standard gage tracks of the electric line, a driveway for the trucks and storage space with wooden horses. The mobile equipment consists of a 5-ton truck chassis, six container units, an electrically driven flat car and trailer. The containers are the same as those employed in the steam line l.c.l. interchange service except that they have been provided with sliding doors. For this purpose angles were extended back from the doors at the top and bottom of the unit and the door is divided at the center with door stop arrangements similar to those of the ordinary box car. The bodies are 17 ft. 6 in. long, 8 ft. wide and 7 ft. 3½ in. high, inside dimensions.

The electrically driven container flat car has controls and trolley at each end. An old passenger car, that otherwise would have been scrapped, was remodeled at a total cost of about $500 by removing the body and lengthening the frame about three feet so that two containers could be carried. Steel 3-in. angles anchored to the floor, laterally and longitudinally, hold the units securely. The trailer car consists of a simple steel frame 20 ft. long mounted on two single axle

Motor Truck and Container Ready to Leave

spring trucks and carries one container. This container train is operated by a crew of two men, the motorman and the conductor.

Actual Moving of the Freight

After the containers are loaded on the truck at the off-track station the driver receipts for the load, as represented by the abstract, taking two copies together with the corresponding way bills to the rail transfer. The driver retains one receipted copy of the abstract when his load is received by the train crew. All freight carried in the containers is under the railroad's seal. Before the truck has arrived at the transfer, the two-man crew has already unloaded the container from the flat car and placed it upon the wooden horses.

Upon arrival of the truck, the same crew loads the outbound container from truck to flat car or trailer and then loads the return unit from the wooden horse to the truck. Five minutes per unit are allowed for these mechanical interchange movements. The truck then delivers the return container to the downtown off-track station, after which it is released. Space is provided at this point for two bodies so that one is always available for outbound loading by hand truck from shipper's trucks or drays.

The two-man crew unloads the freight from the containers at line destinations; it also makes store door deliveries and collections of light consignments to and from shippers adjacent to the railroad. At Valley Junction the trailer is dropped off for transmission over the branch to Harrison by passenger car, while the self-driven container car proceeds to Aurora. On the return trip the crew loads freight from way station platforms through the side doors without consideration to station order since all shipments are segregated upon receipt at the off-track station.

Since the inauguration of this service both outbound and

Interior View of Off-Track Station Showing Containers Being Loaded

inbound business has increased rapidly, reaching by January 10, 1922, a sustained daily average of 9,000 lb. outbound and a fluctuating inbound agricultural commodity movement of from 1,000 to 12,000 lb. daily. Thus, at times, it has been necessary to use an additional truck chassis providing for simultaneous two-truck movements under a five-minute headway. The outside platform area at the downtown station is 382.5 sq. ft. and the inside, 748.5 sq. ft. This inside area is extended to 1,028.5 sq. ft. by the addition of 280 sq. ft. of floor area provided by the two bodies. It is estimated that this fixed plant is capable of passing 160 tons of freight per 8-hour shift.

FOUR EMPLOYEES of the Denver & Salt Lake were killed when a snow-slide swept a locomotive and six men off the track into a canyon near Loop, Colo., February 19. The four men killed were on the ground shoveling snow to fill the tank, when the slide swept all from the tracks into the canyon. The two men on the tender were saved from death by the protection of the walls of the tank.

THE GULFPORT & MISSISSIPPI COAST TRACTION COMPANY, operating 20 miles of line between Biloxi, Miss., and Pass Christian, making connection with the Gulf & Ship Island at Gulfport, has been adjudged a common carrier of freight in both intrastate and interstate traffic. The officers of the company are: President, W. T. Stewart; general manager, W. A. Sullivan, and traffic manager, T. E. Harris.

The Consolidation of Freight Terminals

This Is Not Desirable for Many Reasons—Railroads Must Improve Terminal Efficiency

By F. J. Lisman

TO THE PUBLIC the consolidation of terminals means that any shipper will be enabled to deliver his freight at the nearest freight station, no matter what its final destination might be, the same as he would drop a letter into the nearest letter box. Just what this would mean in the handling and rehandling of freight and switching, needs no comment. Even in big cities which have but three railroad systems, like Boston, Philadelphia and Baltimore, this letter box system of freight delivery would not be workable, on account of the cost of rehandling. In the countries of Europe, where the railroads are either owned outright by the government, or are divided into regional groups, freight for any particular point of destination can generally be delivered at only one freight house in each city, except in the case of very large cities where three different freight stations may be available. No doubt if we had similar conditions here, a similar system would prevail and thus the railroads would get more benefit from consolidation and the public would get less service. If unification of terminals would mean less service to the public, the public would not want it.

To those who theorize about possible savings in railroad operation, consolidation of terminals undoubtedly does not mean quite the same thing as it does to the man in the street above referred to. These people no doubt are thinking about consolidation of all terminal facilities owned by all the railroads within certain limits, either within city limits or within limits to the outer yards, etc. Consolidation of this kind would mean that all the companies owning terminals of any kind—tracks, yards, warehouses, freight buildings, team tracks, etc.—would turn them over under a long lease to a new terminal company. The fee naturally could not be turned over to this new terminal company, because terminals in nearly all cases are covered by a variety of long time mortgages. The terminal company would then be expected to act as agent for all the railroads entering a given city, giving each one equal facilities and treatment.

High Cost of Operating Joint Terminals

Presumably each railroad would have a representative on the board of directors of the terminal company, which would select a manager to operate the property for their joint account, each tenant paying according to usage his proportion of operating expenses, rentals, interest charges and taxes. Assuming there are ten railroads interested in such a terminal company, no one of these ten would be particularly interested in its most economical management. It is but human, for instance, to advance the salary of a general manager, even though he may not be entitled to it, just because he is a good fellow, as long as nine-tenths of such an advance is paid by the other man. Likewise, what almost might be called disinterestedness, will permeate the whole management, and such a terminal company would not be operated as economically as at least eight of the ten railroads would operate their own specific properties. Quite true, many switching movements might be eliminated by such joint management or by the joint use of tracks, but it is very doubtful whether the savings at the end of the year through the elimination of unnecessary switching engines will overcome the indifference due to a management which has no keen desire to save and which is not supervised by a real boss who watches every expenditure. Most railroad men express themselves strongly on the subject of high cost of operating joint properties.

There is an approach to a unification of terminals in the case of the Terminal R. R. Association of St. Louis. The writer does not happen to be familiar with the management of this property, but since its creation quite a number of the lines have established separate freight stations, like the Rock Island, the St. Louis-San Francisco, the Missouri, Kansas & Texas, etc. The extravagant cost of handling passenger business through the big union stations, like Washington, St. Louis, Kansas City, etc., is quite notorious.

Underlying the movement for consolidation of terminals is the idea that expenditures for additional terminals in the future could thereby be saved; but as a matter of fact the development of terminals during the last ten years has been comparatively small and has nowhere been carried on with the idea of anticipating the future, because the railroads have not had the necessary money to do this, nor has there been any encouragement for them to do so. While some railroads may own some undeveloped land available for terminal development, here and there, taking the country as a whole terminal facilities are nowhere excessive. During the period of heavy traffic during the war and up to the fall of 1920, there was a great lack of terminal facilities in the way of yards, sidings, freight houses, etc. Consolidation may in exceptional cases induce the additional use of certain tracks or gauntlets, but probably not of freight houses, docks or even team tracks.

The present Transportation Act may be unconstitutional in so far as it provides for a division of the surplus earnings over 6 per cent with the government. Quite likely the Supreme Court will finally hold that a company is entitled to a fair rate of interest on the capital invested and that a fair rate is 6 per cent, but it is not likely the court will hold that if the companies earn only 3 per cent in one year they will be compelled to divide the surplus above 6 per cent which they may earn the following year. In other words, an average of 4½ per cent would not be a fair return on the money invested and a company therefore should not be compelled to give up any of the surplus earnings unless it has a fair average or cumulative return on the invested capital.

Penalizing the Far-Sighted

Suppose the management of a company has been far-sighted in the acquisition of terminals in a given city and that a large amount of tonnage originates on these terminals. If such terminals were put into a consolidated terminal company on a basis of physical valuation, the company which owns them would lose the benefit accruing therefrom; that is, it might be deprived of a large amount of this traffic and its earnings might fall considerably below the maximum allowed under the present law. Our most successful railroad corporations have generally succeeded because the management over a long period of years has been far-sighted in acquiring ample terminals at all points along their lines on which in course of time all kinds of industries have located. Should these valuable traffic producing facilities now be taken away from them, so that those who have never sown may reap? If a scheme of consolidation of terminals should indemnify these companies for loss of business, the situation might be different.

Theoretically since all railroad companies must switch

from each other, the shipper is supposed to have the choice of routing his freight, but as a matter of fact it is doubtful whether 1 per cent of freight shipped, say, out of the terminals of the Chicago, Burlington & Quincy from Chicago and destined to a local point on the C. B. & Q., is ever routed over any other road. Switching to other railroads, as a rule, is confined to that from manufacturers' sidings to off-line points.

If the terminals in all cities are to be merged, a very large proportion of competition must necessarily be done away with because a large proportion of this competition consists of offering better terminal facilities and prompter handling through the terminals. If a shipper can send his freight to and from a joint terminal over any route between Chicago and Omaha, then the actual competition in service will consist only in more rapid handling of the business over the line or in prompter or more liberal settlement of claims or a more liberal distribution of cigars by the traffic men. Surely competition should not be reduced to these elements only.

While the present system of philosophy is based on the theory of "the greatest good to the greatest number" the carrying out of this philosophy, like that of all socialistic theories is based on the exploitation of those who have been wise and thrifty in the past; but this does not encourage others to build for the future. Under such conditions there will be no further development by forward-looking people. To sum up:

1. It remains to be proved that joint terminals will in the long run be economical of operation.
2. Development of terminal facilities which may be needed by communities in the future will hereafter not be anticipated.
3. As the properties of these joint terminal companies which are to be created will consist mostly of leaseholds, with a variety of mortgages, it will be quite difficult to finance such terminal companies to the best possible advantage unless all the tenant railroads join in a several and joint guaranty of the securities which are to be issued. Should and can the strong corporations be compelled to use their credit for the benefit of their weak competitors?

If the cities themselves, through their officials, become interested in these joint terminal companies, can politics be kept out? Is it not better after all to leave the development of the country and its cities to enlightened self-interest? This has been more successful than any other system devised in the history of the world. Are we not attempting to fly from conditions which can hardly be called evil to evils which we know in part and the extent of which we certainly do not know fully?

Terminal Handling Methods Inefficient

With the readjustment of the cost of living now under way, every effort must be made to reduce expenses in all directions. Railroad companies are expected to do their full share in this and certainly none will claim that the cost of passing the various commodities through the various terminals has reached perfection.

Motor trucks are taking a large amount of the short-haul business. In many cases this seems beneficial to the railroads, but just where the line is to be drawn seems an unknown factor at this time. The railroad companies need all the business out of which they can possibly extract a profit. One of the great advantages of the motor truck is the door to door delivery. There would appear to be every reason to believe that the railroad companies can arrange for deliveries as cheaply, if not cheaper, than motor trucks, because the motor truck mostly assembles and discharges its freight in small amounts, while the railroad company brings in or takes out goods by the carload; therefore, a railroad motor truck, at least, either begins or finishes its trip with a full load.

After all, the present manner of conducting a freight house is the outgrowth of primitive conditions. In a country town when the local freight train comes along, it will discharge a few packages, whether they be boxes, sacks or barrels, etc., which are dumped on the platform or hauled into a freight house and then the local agent will call to the country merchant across the way from the station or send a message to him by some passing boy or driver to get his stuff which has just arrived. In the larger communities business is done in not quite as haphazard a way, but nevertheless freight cars are discharged practically by hand and the freight is handled and rehandled. If the L. C. L. freight in a community of say 2,000 were loaded on to a motor truck directly out of the car and delivered within a mile radius, it would probably cost very little more than it does to handle the business into the freight house, send out postal cards and in the meanwhile run the risk of loss and damage. In many cases goods are handled by the old fashioned hand truck by laborers who work as slowly as possible; who are likely to go on strike and who are otherwise not dependable. In many cases it might be possible at a very small cost to provide for increased mechanical handling by endless belts or escalators, etc. If escalators could be standardized so that they could be manufactured on a large scale, their cost would undoubtedly be greatly reduced, probably by over 50 per cent.

Interstate Commerce Commissioner Hall has given this particular phase of terminal work a very large amount of study and is probably more familiar with it than anyone else. He is decidedly of the opinion that this phase of the science of transportation has been grossly neglected.

Suggestions for Improvement

The writer had the pleasure of spending two days in the year 1914 with Henry W. Thornton (who was afterwards made brigadier general and knighted), general manager of the Great Eastern Railway of England. In answer to a question as to the relative merits of American and English railroad management Sir Henry Thornton replied that as far as terminal work was concerned English methods were much more satisfactory than American methods. He went on to explain that conditions were quite different owing to lighter cars which could be switched by horse power, etc. Nevertheless, there appears to be an unnecessary amount of lost motion in terminal work in this country, not only in the handling of freight but also in the handling of cars. Switching engines capable of hauling 30 to 40 loaded cars, are employed a large proportion of the time in switching from 1 to 5 cars. Possibly a light locomotive tractor could be employed to do light switching to very much better advantage. The Pennsylvania Railroad in Jersey City and the Baltimore & Ohio in Baltimore employ fairly heavy tractor locomotives for switching cars on paved streets. The progress made during the war in the development of tractor machines, which could be used over the worst kind of ground, might point the way to considerable savings in many kinds of switching.

Special Charge for Terminal Service

We are now tending in the direction of store-door or direct delivery for which a commensurate additional charge will have to be made; naturally this will mean that we shall drift towards the British system of fixing rates on a basis of a rolling charge and a terminal charge. Nothing is ever settled until it is settled right and the present system of charging rates irrespective of the cost of terminals is unsound and grossly unfair to the smaller communities. In the *Railway Age* of December 13, 1912, an article appeared by the writer, embodying the following:

> For nearly a century there has been a tendency on part of the population to drift to the cities. The age of steam which has been followed by the age of electricity, has accentuated this movement, as is evidenced by the census of 1910, in practically all the countries of the world. Manufacturers move to the cities because they are attracted by the labor market; by the fact that there is competition in transportation

facilities, and in many cases the certainty of home markets for their products, etc. In consequence thereof, the railroads in order to meet this condition, have acquired expensive terminals as nearly adjacent as possible to the manufacturing district of these cities. They have in many cases gone to a great expense to build sidings to various factories erected in the centers of these communities.

Unless something is done to check this movement towards the large cities, the railroads will have to increase these heavy expenditures. I do not presume you question the necessity of doubling the terminals every ten to twenty years in the various cities, like not only New York, Chicago, Philadelphia, etc., but also in the smaller size manufacturing towns, like Newark, Paterson, Elizabeth, Trenton, N. J.; Wilmington, Del.; Chester, Pa.; South Bend, Ind.; Kalamazoo, Mich.; Rockford and Joliet, Ill.

What compensation will the railroads get for this increased capital expenditure for the increased cost of switching these cars over the multiplicity of sidings in order to reach their particular distination?

If the establishment of manufacturing plants were encouraged in the smaller communities, the local freight train in many cases could drop off one to five cars at some factory siding, located opposite the freight house or within one or two blocks of it, and the train could move on.

Compare cases of this kind of delivery with the delivery of cars on any of the local freight stations of important lines, or the site of a factory in the manufacturing district of Jersey City or Chicago. The difference in the cost of switching engines, as well as cost of real estate over which trains are run, etc., is, taking everything into consideration, from $3 per car upwards.

Supposing the little community was to get the benefit of this $3 per car. It would go a long ways towards overcoming the disadvantages of the smaller community compared with the larger one and its broad labor market, which now largely brings the factories to the big communities.

If a difference in rates can be established which is based both on cost of service and value of service, as previously stated, it would go a very long way not only towards avoiding car shortage, the congestion of terminals, but also the congestion of people in the large cities and thus help towards solving one of the biggest problems of our times. The consequences of such a change in the rate making fabric are so broad that space does not permit going into details.

There would be a great deal of opposition from the various chambers of commerce in the various cities, which are interested in building up their towns, the value of real estate and the business of their merchants. On the other hand, the small towns have no such organization. Should not a broad patriotic and philanthropic point of view prevail over a selfish one?

I do not wish to suggest that the rates to the smaller communities should be reduced; on the contrary, the shipper in the larger city should pay a terminal charge above the existing rate in order to compensate the companies for the more expensive service.

Factories in Country Districts

Commissioner, now Chairman, C. C. McChord of the Interstate Commerce Commission, wrote an article entitled "Diffusion of Factories to Country Points," which appeared in the Washington Post of July 28, 1918, and which became part of the record of the Senate Committee on Interstate Commerce.

The following extract is quoted from this article:

The most important matter just now, however, is the part that the railroads should play in the readjustment that must be made in our industrial and economic conditions. As before noted, it has come about that the larger part of our manufacturing is done in our cities. The greatest manufacturing cities of the nation, considering the variety and quantity of production, are Chicago and Philadelphia. Southern New England has developed into a succession of manufacturing cities. Pittsburgh dominates the iron and steel industry and controls prices wherever sales may be made in this country, as Chicago dominates and controls the prices of meats and their products. New York City produces immense quantities of readymade clothing, employing thousands in sweatshops of unsavory surroundings. The result is that workmen and women in largest numbers live under conditions that are not sanitary, wholesome, nor conducive to good morals. This has happened in a country that is less densely populated than any of the great nations of earth and where there is room enough for every citizen and resident to enjoy his full share of pure air and sunlight and to live under conditions conducive to health, morality, and happiness. It would also enable him to secure a home at moderate cost or at reasonable rental, with an area of ground sufficient to permit him to cultivate a garden, where fresh vegetables may be grown for his own use.

Many good people have organized societies and have expended large sums of money in philanthropic efforts to induce immigrants and others to shun the haunts of their fellows in crowded cities and seek homes in the South and West, where conditions are wholesome. In this they have met with a measure of success, and thriving communities composed of different nationalities may be found scattered over the land. At the same time, however, our cities have continued to increase in population, and living conditions there have not improved as a consequence.

There are many considerations that dictate a relocation of our manufacturing industries. In the first place, it costs more to do business in a city than in the country. Land values and costs of construction of plants, taxes, etc., constitute charges that must be met from earnings. It costs more to live in a city than in the country. A lower wage payment in the country than in the city would enable the workman to secure more comforts of life, to clothe his family better, and educate them more adequately. If the factory is located near the raw product, there is saving in transportation costs which will be reflected in net earnings.

Municipal Interference Undesirable

Interstate Commerce Commissioner Hall called the writer's attention to the very interesting and most modern development in terminal and port facilities in Astoria, Oregon, constructed by the city authorities at that point. In his opinion much is likely to be done in that direction by other municipal authorities, the same as has been done in some of the large European cities like London, Liverpool, Antwerp, Hamburg, Havre, Genoa, etc.

If this should be the tendency in the development of tidewater terminals, we may find that some cities will be willing to handle their terminal work at less than actual cost in order to attract traffic. It is very undesirable that cities should compete with each other in any way but on a sound business basis; if one given city were to handle business over its terminals at less than cost other cities will be compelled to follow the same course, and in the end the deficit will be laid on the taxpayers in general instead of making each class of traffic bear its due proportion. Indirect taxation for any purpose whatsoever is subtle and leads to extravagance.

From the moment municipalities undertake to do business for their own account the game of log rolling, incorrect bookkeeping and insufficient depreciation commences and only the sky seems to be the limit. Each administration tries to pass the buck to the next one, etc.

Railroads Must Get Busy

With the increased complexity of our modern civilization, a large part of the public demands (the rest of the public does not object) that municipalities take on new responsibilities and duties under which is included the great problem of reducing the cost of food products to the ultimate consumer. Unless the railroads impress the public with the fact that they are doing their full share in this direction by cutting down every possible expense, many cities are likely to take over a substantial portion of this phase of the transportation business. Railway officials, therefore, must make a thorough study of co-ordination of economic terminals for food products in connection with wholesale and retail food markets.

Fuel and Locomotive Performance on the Central of Georgia

THE statement has been made that whatever tends to conserve locomotive fuel tends also to improve the general operating performance of a railroad. This seems to be borne out by the statistics of the Central of Georgia for the year 1921. During the year the railroad conducted a fuel economy campaign that developed a fine spirit of co-operation among the employees. The results in fuel saving were excellent. As shown in Table 1 the railroad saved more than half a million dollars during the year by improved locomotive fuel performance, this saving resulting in part from direct reductions in the fuel bill and to a lesser degree from incidental economies in operation as shown in the summary.

The spirit developed by the campaign on fuel saving has materially affected the operation in other ways and it is felt that it was an important factor in the excellent passenger train performance. Throughout the 12 months, 98.7 per cent of all passenger trains were on time. The operation of manifest freight trains was also improved, the percentage on time increasing from 76.5 in 1920 to 93.1 in 1921. Engine failures were materially reduced and the average mileage per failure rose to 57,572. Overtime was reduced to a remarkable degree, the overtime for enginemen and trainmen in 1921 being 23 per cent less than 1920. In yard service, overtime was 45 per cent less and in shops, 67 per cent less.

In announcing the results of the fuel saving campaign,

the Central of Georgia Employees' Magazine makes the following comments:

"It is not necessary to state that this amount of money saved in coal has enabled the maintenance of equipment and maintenance of way departments to work more men and to use more material in the past year than would have been possible if this saving had not been effected.

"The credit for this fine performance is due to every one on the railroad who had anything to do directly or indirectly with the consumption of coal. By this time, as a result of the very intensive campaign on fuel economy, all of us are thoroughly familiar with the fact that practically every one on the railroad has something to do directly or indirectly with the question of fuel economy.

"At the various meetings which have been held by division committees on fuel and employees generally on the various divisions, the latter part of December, 1921, and the first part of January, 1922, resolutions have been made to the effect that every effort will be made to make a still greater saving in the year 1922. Fuel economy is a vital element in the operation of our railroad at this time; not only in respect to the direct saving as result of decrease in amount of coal used, but it has a direct influence on the prompt handling of business. The employees of the Central of Georgia are to be congratulated on the fine showing in the year 1921 as reflected by the figures given herewith."

TABLE 1—ANALYSIS OF FUEL SAVING

Actual cost of coal 12 months ending December 31, 1921-1920, as charged to operating expenses

	12 Months 1921	12 Months 1920	Decrease
Tons of coal	511,520	637,412	125,892
Cost	$2,092,647	$2,741,133	$648,486
Average cost per ton	$4,091	$4,300	$0.209
Saved by better performance			91,254 tons

At an average of 50 tons per car, the detention of 1,825 cars was saved.
Figuring an average of 10 days per car, from mine back to mine, there were saved 18,250 car days.
Figuring an average of 28 cars per train at an average haul of 250 miles, there were saved the operation of 261 trains, also operating 32,625 locomotive miles.
Saving in car miles and ton miles based on average haul of 250 miles loaded cars and 250 miles empty back to the mine:

Car miles	912,500	..
Ton miles	36,503,750	

Summary Saving in Money

91,265 Tons of coal valued at	$350,999.47
18,250 Car days at $1.00 per day	18,250.00
36,503,750 Ton miles at actual transportation cost, or .0034 per ton mile	124,112.75
Locomotive repairs 32,625 miles at .30 per mile	9,878.50
Freight car repairs 912,500 miles at .02 per mile	18,250.00
Total saving	$521,399.72

TABLE 2—PASSENGER TRAIN PERFORMANCE, 1921

Month	Number passenger trains run	Number passenger trains on time	Percentage on time
January	2,937	2,867	98
February	2,656	2,592	98
March	2,941	2,888	98
April	2,850	2,816	99
May	2,814	2,779	99
June	2,792	2,763	99
July	2,814	2,780	98.8
August	2,820	2,802	99.4
September	2,722	2,706	99.4
October	2,811	2,795	99.4
November	2,803	2,779	99.1
December	2,935	2,889	98.4
Totals for 1921	33,895	33,456	98.7

TABLE 3—COMPARISON OF ENGINE FAILURES, 1920 AND 1921

	Number failures		Miles per engine failure	
Month	1921	1920	1921	1920
January	16	40	42,788	18,015
February	17	27	36,731	25,452
March	18	48	39,198	15,462
April	6	34	112,174	19,733
May	11	17	63,271	41,716
June	6	19	118,942	39,317
July	8	31	94,406	22,492
August	12	33	58,747	22,731
September	16	42	40,611	17,132
October	6	19	112,813	38,457
November	15	36	43,139	18,966
December	13	24	48,819	29,045
	144	370	Average 1921 57,572	Average 1920 23,798

Increase in average miles per engine failure, 1921 over 1920, 33,774 miles, or 58.66 per cent.

"After Highways Are Pounded to Pieces—What?"

THE California Electric Railway Association has recently issued a booklet which it has given wide distribution among the chambers of commerce and the traveling and shipping public in general throughout that state. It contains abstracts from the editorials of 78 Californian newspapers, all of which strongly advocate a change from the present day policy of permitting the unrestricted use of boulevards and other paved roadbeds by private parties, companies, and corporations for transacting freight and passenger business by means of heavy and overladen trucks which, at the same time, establish unfair competition with the railroads.

As the San Luis Obispo Telegram sees it, "there is absolutely no justice in allowing bus and truck lines to operate on roads paid for by the public and, by so doing, cripple or kill the railroad systems which have developed the country and are absolutely essential to the welfare of any community." The Hanford Journal further substantiates this viewpoint by stating "Who is wearing out our highways? Not the business and pleasure cars operated by the people who paid for the roads and are paying for their maintenance. No, they are being hammered to pieces by the heavy passenger busses and the overloaded trucks that are being operated by individuals for profit at the expense of the people. If the business of a railroad is depleted by the competition with trucks and stages, the railroad has a right to apply for higher rates on freight and passenger service, in order that it may yield the return to which it is entitled upon its investment. So, while the people of the country are patronizing trucks and stages, and burdening themselves with the enormous expense of maintaining the highways for the trucks and stages, they are also forcing the railroads to demand and receive greater rates for their service."

"Trucking and passenger motor routes," says the Wheatland Four Corners, "should adequately compensate the state for using the highways, of which much of the building and maintenance costs are derived from the railroads through taxation," and the Tulare Register feels it is unjust that "railroad companies must lay their own rails, maintain their own rights-of-way and general equipment of rails, switches and many other items, while the motor truck is provided by the state with a free right-of-way and a fine roadbed."

Representing one of the richest farming districts in California, the Imperial Valley Press states, "We try to make the railroads pay all the taxes that the traffic can bear, but their competitors on the highways have roads built for them at the public expense, and they get off with a normal license fee. While the San Francisco Chronicle says, "No form of automotive traffic on the highways can of itself develop new territory on any important scale. It cannot create traffic. It can only compete for traffic developed by others."

From every dollar that is collected by the railroads 5¼ cents under the old law, and 7 cents under the King bill, goes into the state treasury. "This," says the Indio Palm, "is where the state gets its money with which to build public highways. Every dollar collected from the public by a motor transit company is a dollar taken away from the railroads, 7 cents taken away from the state treasury, and a proportionate amount taken away from the cause of good roads, while every dollar's worth of business that is diverted from the railroads leaves a deficit of one dollar on the company's balance sheet and calls for a corresponding increase in freight and passenger rates somewhere else."

The San Bruno Herald believes that "it is through the railroads alone that we can expect adequate service and that which will develop with our growth and needs. The motor truck can never cover efficiently the field of commercial activities that the railroad does."

The I. C. C. General Rate Investigation

Pooling of Freight Cars Proposed by National Association of Owners of Railroad Securities

WASHINGTON, D. C.

APPROVAL by the Interstate Commerce Commission of a plan for the pooling of freight cars and their purchase, inspection, repair, rebuilding and direction by the National Railway Service Corporation, organized by the National Association of Owners of Railroad Securities, was urged by S. Davies Warfield, president, and other representatives of that association at the rate hearing before the commission on February 15 and 16. Immediate consideration of the plan was asked and it was stated that the association is ready to obtain the introduction in Congress at once of the necessary bills, including one to make the $300,000,000 loan fund available after March 1. The service corporation under this plan, which was worked out by the association's Board of Economics and Engineering, and described in detail before the commission by W. W. Colpitts, a member of the board, would act in collaboration with the American Railway Association.

The savings to be effected by the plan were estimated by Mr. Colpitts at $300,000,000 a year, including the following items: Reduction of empty car mileage, $9,000,000 per annum; reduction in first cost of new equipment, $33,000,000; saving in financing cost of new equipment, $23,000,000; reductions in cost of freight car repairs, $30,000,000; saving through retirement of weak cars, $96,000,000; saving through improved distribution, $66,000,000.

"Of all railroad facilities there is none that presents a greater opportunity for joint use or co-ordinated relation than the railroad freight car," said Mr. Warfield. "It is the hybrid of hybrids. It has its birth on the owner railroad and spends 60 per cent of its life on foreign lines; it is responsible to no one and no one is responsible for it. No one seems to care whether its life be long or short, because of its migratory habits and abode.

"The faults of the system have ranged from inefficiency and carelessness to the extent of conviction for causing bills to be rendered for repairs not made. Such a system cannot produce economical results." He stated that, to secure full results, the present state charter of the service corporation should be superseded by a federal charter. The board of trustees of the service corporation would be evenly divided between executives of the railroads and representatives of investment and business interests, such as compose the present board of the service corporation; the trustees representing the railroads to be selected by each of the four railroad groups now established by the commission.

"The service corporation, through loans made by the commission from the $300,000,000 revolving fund," he said, "has financed equipment for carriers under the plans of the corporation on more advantageous terms than obtained outside by roads of stronger credit."

Immediate Consideration Urged

Walter L. Fisher, of counsel for the association, urged the immediate consideration of the proposals. "We are in a really serious situation with respect to the transportation system of the United States," Mr. Fisher said. "We have only two sources from which to make effective the necessities—either increase the efficiency and economy of the railroad system or impose an additional burden upon the shippers in order to maintain transportation. I say that not with reference to the return upon the investment but as regards the new funds that are needed.

"We have to find some way in which this railroad system can be kept functioning. There are two great factors that upon the very first inquiry into the matter reveal themselves as promising relief; they are not small measures of relief, but perfectly enormous. They are the rolling stock and terminals. The report of the board with respect to terminals is not yet available, but the report with reference to the rolling stock has been completed. The reason we came here before you at this time is the exigency of the situation. If you are to utilize this service corporation to which Mr. Warfield has referred, Congressional action must be taken, because the use of the revolving fund expires on March 1. You have to take other action which possibly does not require that authority. You are requiring reports now with respect to the excess over 6 per cent which 15*a* of the Transportation Act requires. That fund is available.

"If the government should be driven to guaranteeing the equipment certificates, that, as we see it, will necessarily be regarded as an incident for the subsequent guarantee by the government of other things. The equipment certificates are those the railroads can finance better than other securities. You have a concrete demonstration of the ability of the National Railway Service Corporation to finance equipment trust certificates at better rates for the weaker roads than the strongest roads of the United States have been able to finance their certificates.

"Why was it able to place car trust certificates? Representing as it does, constituted as it is of these large investing institutions—they are not bankers, they are not brokers, they are not buying securities to sell them—but they are life insurance companies and savings banks that form the backbone of this association. The savings banks, together with those insurance companies, are ready to buy these certificates direct; they cut out the commissions, the brokerage, and the intermediate profits that would otherwise accrue. If you can stabilize those securities so they can buy them, they are a legitimate form of investment for these institutions.

"This agency is available. As I understand it, it asks no participation except service. There shall be no profit whatever. Here we are representing the rail fundamental securities of these railroads. You have an agency which is sympathetic with the operating end, sympathetic with the public end, and acting under the control and supervision of this commission it can be a tremendous effective agency in bringing about those efficiencies in railroad rolling stock and terminal facilities which are so absolutely essential to any adequate relief of this situation.

"We know the difficulty the commission has in performing the matters of routine work that come before you. We merely wish to offer real opportunities to reduce your labors and present you with material which you can take and put up to be shot at and if it stands analysis you can adopt it. Constructive measures should be the chief work of the commission. In fact, it is almost impossible not to confine yourselves to details and yet the constructive measures are the things that will put the commission in the absolute confidence of the people of the country, make it that great agency for the regulation of our transportation system that it is intended to be, but now must be the time."

Commissioner Hall remarked: "I don't challenge your statement, Mr. Fisher, but it will hardly satisfy 1800 litigants a year filing that number of complaints with the commission if their complaints are pushed to one side while we consider constructive measures. There are 700,000 cars at

the present time in the United States that are not in condition. There has been a certain amount of deferred maintenance, and that has had its effect upon the cars, upon the lessening of expenditure which has brought about the showing the carriers have been able to make for the year 1921. Of course, whoever does it, however it is done, the putting of the bad order cars into good order is going to cost money. This plan you figure on here, does not that involve money, the outlay of money by the carriers?"

"It does," replied Mr. Fisher, "and it proposes, if the chairman please, that this service corporation will undertake to do that work for less money than the carriers will otherwise have to pay to do it."

Proposed Plan of Operation

Mr. Colpitts stated that the pressure for reduced rates is so insistent in the present depressed state of business that means must be sought for meeting this demand, and the board has reached the conclusion that centralized control of interchange freight cars furnishes the most practicable method for effecting an immediate reduction of operating expenses sufficient to aid the carriers in a material degree toward accomplishing this end.

The plan generalized provides for placing all cars normally used in general interchange subject to the control of the central agency with the concurrence of the owners, each railroad retaining its local or special equipment. The ownership of existing equipment would not be disturbed, Mr. Colpitts said. Where unequal ownership of freight cars exists carriers would be required to bring up their quota of cars to meet the country's needs.

Mr. Colpitts summarized the benefits as follows:

"The central agency would immediately arrange for the repair or rebuilding, either in railroad shops or those of car builders of the 300,000 bad order cars, and for the retirement of the much larger number of small capacity weak cars and their replacement with modern cars of larger capacity so as to provide ample equipment against the return of normal traffic. The employment of the men and the purchase of the materials and supplies which this plan involves will aid appreciably in restoring business activity and in putting to work 550,000 idle cars.

"Under unified operation of freight cars, shortages will be less frequent and of shorter duration, and shippers will have greater assurance of receiving cars when and where needed. The program for new construction and replacements will permit of more adequate provision of cars designed and adapted to meet special needs such as the movement of the grain of the West, the citrus fruits and vegetables of California, Florida and the South, and products of the East and Central West.

"Through central control of the equipment, it is quite possible to establish a program of replacements which, within a definite period, say five years, would eliminate all wooden cars from interchange service. In January, 1921, the total number of wooden cars in service approximated 890,000, with a capacity ranging from 30 to 35 tons. It is proposed to replace these 890,000 cars within a period of five years with 540,000 steel underframe cars of 50-ton capacity."

He said that in collaboration with the American Railway Association it is estimated that the service corporation could establish a standard design for cars of different capacities; that the agency could best distribute such surplus cars from a railroad where cars are now owned and only used for that railroad's seasonal requirements, so that such cars could be used many times over to meet the conditions of seasonal requirement of other roads and localities. Cars would be inspected at interchange points and where repairs or rebuilding is found necessary they would be assigned to either the shops of car manufacturers or railroad shops nearest the point of inspection, whichever would prove the more economical. Local group committees could be appointed throughout the country whose function it shall be to know in advance the needs of each section and distribute cars in accordance with local requirements, the chairman of each group committee to be the chief routing officer of the district.

Carriers would no longer bill each other for per diem, repairs, etc. All such items would be charged to and by the agency and cleared by the agency. Each carrier would be concerned only with the balance between interchange cars on its own rails and its contribution of cars to agency control, subject to such exceptions as may be made in case of waiver of per diem. The agency would undertake to supply participating carriers with their normal needs at all times and with their appropriate share of the surplus over normal needs. The cost of operating the agency, not specifically allocated, would be assessed according to car use.

F. H. Wood, commerce counsel of the Southern Pacific, asked whether the probable results of the plan were such that the commission would be justified in making an immediate reduction in rates or whether it would not take considerable time to make the results felt.

"Any savings are required by the railroads to help their credit," replied Mr. Colpitts. "This is not in any sense an argument for reducing rates at this time. Some of these savings would grow from year to year and reach their maximum in five or ten years."

Mr. Wood asked if the fact, as testified by Mr. Aishton, that the average percentage of empty car mileage during federal control was about the same as it had been for 15 years before, would not shake the witness' confidence in his prediction of saving in empty car mileage. Mr. Colpitts said it would not.

Testimony of Shippers

The hearing on February 16 and 17, following the testimony of Mr. Colpitts, was devoted to shippers of fruits and vegetables. In general they asked the removal of the balance of the increases made in Ex Parte 74.

R. G. Phillips, appearing for the International Apple Shippers' Association, the National League of Commission Merchants and the Western Fruit Jobbers' Association, presented numerous voluminous exhibits to show that the freight rates are absorbing a large percentage and in many cases all of the wholesale price. His statement devoted considerable space to answering editorials in the *Railway Age* which had called attention to the wide margin remaining between the retail sales prices of vegetables and the amounts paid to the growers and the railroads, but his statement attempted to defend the wholesaler and the commission merchant against charges of profiteering rather than to explain the prices charged to the public.

Commissioner Hall remarked that the "profiteering" charges were not in evidence before the commission. Mr. Phillips and other witnesses, representing various associations of growers and distributors of fruits and vegetables, who testified, had many statements analyzing the expenses involved in the shipments of thousands of cars to show that the producers and the wholesalers received little or no profit after the freight and other expenses had been paid, but they were generally unable to give satisfactory answers to questions asked by the commissioners to show whether or not the examples given were representative and what became of the balance of the price paid by the consumer. Some of the witnesses asked that the pre-war rates be restored.

Samuel Fraser, a fruit dealer and grower of Rochester, N. Y., objected to an advertisement used by the Louisville & Nashville, which showed that on watermelons shipped from Albany, Ga., to Baltimore, the grower received 7.52 cents, the carrier 12.7 cents and the "middlemen" 80 cents. He had an exhibit covering 1,233 cars of watermelons shipped from the Southern states to Northern cities which showed

the freight rate per melon to be 12.4 cents, but his figures stopped at the wholesale prices.

February 18 was devoted to testimony on behalf of shippers of milk, cream and dairy products, February 20 to beverages and beverage containers and waste material, and February 21 and 22 to livestock and packing house products. The commission's schedule provided also for testimony on petroleum and petroleum products on February 23 and 24 and other commodities on February 25. March 2, 3 and 4 have been set aside by the commission for rebuttal evidence on behalf of the carriers and March 8 to 11 for oral argument. In a notice regarding these dates the commission said that cumulative argument should be avoided and argument should be confined to the outstanding aspects of the case. By cooperation the parties should endeavor to reduce the number of persons to be heard. Brief printed abstracts of the main facts relied upon and of the argument may be presented at the time of oral argument. Voluminous and exhaustive abstracts or arguments are not desired. Parties not participating in the oral argument who have presented evidence may present such abstracts on or before March 8.

W. E. Rosenbaum, traffic manager of the Anheuser-Busch Company of St. Louis, asked for a reduction in the rates on cereal beverages, saying the present rates are mostly "paper" rates and that a reduction would increase the revenues of the railroads because it would increase the tonnage of cereal beverages which are now in competition with the moonshiner, the bootlegger and the home brewer, whose products do not move extensively by rail. "The cereal beverage industry," he said, "realizes the serious predicament of the carriers, they having been hit almost as hard a blow as our industry, but if we are to survive lower freight rates are absolutely necessary."

The representatives of the livestock shippers who asked further reductions in rates were met by cross-examination which brought out the considerable increases in the prices of livestock since the first of the year. Kenneth F. Burgess, of the Chicago, Burlington & Quincy, asked Henry R. Park, traffic manager of the Chicago Livestock Exchange, how he accounted for the increase in the price of hogs on the Chicago market since January 1 of $2.20, or five times the amount of the freight rate from the Missouri river to Chicago, 42½ cents, which represents an increase of 19 cents as compared with the rate before federal control. The witness said it was due to increased demand but that it represented only an "unimportant" increase as compared with 1913.

Dispatchers Given New "National Agreement"

Punitive Overtime Clause Included in Labor Board's Rules—Other Developments in Labor Field

A COMPLETE new set of rules to govern the working conditions of train dispatchers was announced by the Railroad Labor Board on February 20, to become effective on March 1. The new rules, constituting what will eventually be another national agreement, are featured by provisions for the payment of punitive overtime after the ninth hour, for one rest day per week, which must be taken by the employees involved, and for the payment of train dispatchers on a monthly basis. The new code contains specific rulings on the scope, hours of service, overtime and expenses, rest days and relief service, rates and application of pay, and miscellaneous conditions usually covered in agreements of this character. Rules on the subjects of seniority, promotions, vacations and sick leave with pay, are not specifically included in the new code, the Board stating that these and "certain other subject matters may not be covered in all localities by rules of general application and require further consideration by the parties directly concerned."

The new rules promulgated by the Board follow:

ARTICLE I—SCOPE

The term "train dispatcher" as herein used shall be understood to include chief, assistant chief, trick, relief, and extra dispatchers, except chief dispatchers vested substantially with the authority of superintendent or assistant superintendent.

ARTICLE II—HOURS OF SERVICE, OVERTIME AND EXPENSES

(a) Eight consecutive hours shall constitute a day's work for train dispatchers.

(b) All time worked in excess of eight hours shall be paid for on the actual minute basis at pro-rata rate for the ninth hour at the rate of time and one-half thereafter. Time consumed in making transfer shall not be counted as overtime.

(c) Each train dispatcher will be assigned to established headquarters in accordance with seniority provisions and when required to leave such headquarters shall be paid necessary actual expenses in addition to regular salary while away. This section does not apply to relief or extra dispatchers.

ARTICLE III—REST DAYS AND RELIEF SERVICE

(a) Each regularly assigned train dispatcher (and extra dispatchers who perform six days' dispatching service in one week) will be allowed and required to take one day off per week as a relief day, except when unavoidable emergency prevents furnishing relief. If required to work such relief day, extra compensation will be allowed at pro-rata rate.

(b) The carrier shall designate an established rest day for each position in accordance with the foregoing section. Reasonable notice shall be given of change in assignment of rest day.

(c) Where relief requirements regularly necessitate four or more days of relief service per week, relief dispatchers shall be employed and paid the daily rate of each dispatcher relieved, and when not engaged in dispatching service will be assigned to other service and paid therefor a daily rate commensurate with the service rendered.

(d) Relief requirements of less than four days per week will be performed by extra dispatchers who will be paid the daily rate of each train dispatcher relieved.

ARTICLE IV—RATES AND APPLICATION OF PAY

(a) Train dispatchers shall be monthly employees, but the monthly compensation shall be computed on a daily basis.

(b) When necessary to fix a daily rate of pay it shall be determined by multiplying the regular monthly rate by 12 and dividing the result by 313.

(c) Loss of time on account of the hours-of-service law or in changing positions by the direction of proper authority shall be paid for at the rate of the position for which service was performed immediately prior to such change. This does not apply in case of transfers account employees exercising seniority.

(d) Rates of pay for new positions shall be the same as for existing positions of equal scope and responsibility.

ARTICLE V—MISCELLANEOUS

(a) Dispatching offices will be maintained as private as possible.

(b) When assignment by the carrier requires train dispatchers to change their place of residence they will be furnished free transportation for their families and household goods to their new place of residence at time of transfer.

(c) Train dispatchers and their dependents will be granted as liberal transportation privileges as are accorded other subordinate officials and employees.

(d) Reasonable notice will be given of reduction in force or change in hours of assigned positions.

Scope of New Rules Conforms to I. C. C. Regulation

In the general instructions accompanying this decision, the Board, in speaking of the scope of the new rules, cites

the ruling of the Interstate Commerce Commission issued on November 24, 1920, in which it ordered that employees of carriers performing the duties of chief dispatchers, day or night, be classed as officials when vested substantially with the authority of a superintendent or assistant superintendent, and then adds the following explanation:

In its consideration of Article I, defining the scope of the rules for train dispatchers, the Labor Board has recognized the above regulation, which has been in effect incorporated in this article. Under the rule as decided by the Board, each carrier and its employees in disagreement on this article will consider each position involving the work of chief dispatcher in the light of the Interstate Commerce Commission's regulation and of the Board's decision on Article I, and where a chief dispatcher is vested substantially with the authority of a superintendent or assistant superintendent, he will be considered in the official class and will not, therefore, come under the jurisdiction of these rules; where not so vested, he will be considered as coming under the rules.

The new rules will apply to each of the carriers parties to the dispute except in such instances as any particular carrier may have agreed with its employees upon any one or more of such rules in which case the rule or rules agreed upon by the carrier and its employees will apply on the carrier.

Referring to certain other rules which have been proposed by the train dispatchers, the decision says:

The Board has eliminated proposed rules relative to payroll classification, specification of duties, and preference in employment of experienced train dispatchers. These rules shall cease and terminate, except in such instances as any particular carrier may have agreed or may hereafter agree with its employees upon any one or more of such rules, in which case the rule or rules agreed upon by the carrier and its employees shall apply on said road.

In connection with this decision it will be recalled that the American Train Dispatchers' Association first presented its demands for a definite code of rules governing the working conditions of train dispatchers on June 4, 1920. These demands were later changed and during the progress of the hearings on national agreements, in the early part of 1921, an amended proposition was submitted to the Labor Board. Several of the rules requested by the organization in the amended proposition have been sanctioned by the Board in this decision, although the new code is much shorter and less specific than the agreement proposed by the train dispatchers association.

M. & N. A. Employees Ordered to Accept Unique Proposition

The employees of the Missouri & North Arkansas have been ordered by the Labor Board to return to work under the proposition made by Festus J. Wade, and described in last week's issue of *Railway Age*. The Board's decision was handed down on February 18, and after reciting the history of this case—which has been covered in previous issues of the *Railway Age*—described the hearings before the Board on February 15 and includes an opinion and decision in part as follows:

The carrier's request contemplates a reduction in the wages of the employees from the rates established by Decision No. 2 of this Board, an amount equivalent to the decreases authorized by Decision No. 147 for the classes of employees referred to therein in the service of the carriers, parties to said decision, and an additional 25 per cent reduction. There has been submitted to the Board in support of this request considerable data and information in reference to the cost of living, rates paid in outside industries and other relevant conditions referred to in the Transportation Act, 1920.

The representatives of the employees who were present at the hearing held by the Labor Board contended that in view of the conditions hereinbefore set forth the Labor Board had no jurisdiction of this dispute, and, furthermore, contended that there had not been held in compliance with Section 301 of the Transportation Act, the conferences contemplated by said section for the consideration of the justness and reasonableness of the proposed scale of wages.

In its presentation to this Board the carrier has set forth that it has appealed to the Interstate Commerce Commission for assistance to resume operation and has appealed to the executives of carriers in the territory which it serves for a sufficient division of rates to provide adequate income to pay operating expenses, taxes and interest on a proposed loan from the government, if granted. Before the applications with respect to division of rates and government assistance can be finally passed upon a decision from the Labor Board on the question of wages is necessary. The carrier has shown that in order to resume operation of the property a reduction in wages equivalent to an annual saving of $310,000 must be made, and this would require the application of the decreases authorized by the Board in Decision No. 147, for the classes of employees referred to therein and a further reduction of 25 per cent in the wages established by the application of Decision No. 147.

If this request is not granted the carrier contends that it is inevitable that the road must be scrapped, with the result that thousands of people along the line will be out of employment, with great loss and inconvenience to all those who have made investments in farms, homes, manufacturing establishments, financial institutions, schools, and churches along the line of the railroad on the theory that it was to be an operating railroad. The carrier's proposition further contemplates that the owners of the property shall not receive any return upon their investment until the government loan which is contemplated is paid off and wages of the employees are restored to the standard scale.

The employees request that the Board give consideration at this time only to the question of jurisdiction, and if it is decided that the Board has jurisdiction to set a further hearing for the discussion of the merit of the carrier's proposals as to reduction in wages.

Opinion.—The Labor Board has given consideration to the question of jurisdiction referred to by the employees and is of the opinion that it has jurisdiction in this dispute. It further appears that the contention of the employees that this dispute is not properly before the Board in view of the failure of the carrier to hold conferences as contemplated by Section 301 of the Transportation Act, is not well sustained. The evidence shows that the representative of the receiver circulated among the employees a notice of its desire to resume operation and establish certain wages which would permit of saving an amount required to operate the property. This notice was not only distributed among the employees' representatives on the property to which the carrier had direct access, but the carrier's representative appeared at a conference in Chicago conducted by the organizations whose membership was involved in the controversy and made known to those present at said conferences the details of its proposals and sought their acceptance of the reduced scale of wages. The committee representing the Federated Shop Crafts claim that they were not a party to the conferences conducted by the carrier in either St. Louis or Chicago, but the evidence shows that at the conference in Chicago the president of the Federated Shop Crafts was in attendance and participated therein.

Decision.—That the proposition contained in the submission made by the representatives of the carrier, dated October 10, 1921, shall be accepted by the employees, based upon a continuation of the agreement as to working conditions that were in effect as of January 1, 1921, or, in lieu thereof, the decisions the Labor Board has rendered in connection with rules which superseded the several agreements in effect as of January 1, 1921.

While this matter is not in issue at this time before the Labor Board, it is recommended by the Board that all the former employees party to this dispute be reinstated with the continuity of their seniority unimpaired.

Conferences to be held between the representatives of the employees, parties to this dispute and the representative of the carrier, at the earliest possible date, not later than March 1, 1922, to properly and fairly apply this decision.

Pennsylvania Outlines Its Plan for Settling Disputes

The manner in which controversial questions and matters of mutual interest to the employees and the management of the Pennsylvania are settled under the agreements that carriers has made with several classes of its employees is described in a summary recently issued by that carrier. Steps are provided through which the employees or management may carry a dispute culminating in the reference of the dispute to a last court of appeal, "the United States Railroad Labor Board or other public arbitrator to be decided upon by the reviewing committee." These steps may be summarized as follows:

1. The individual employee first takes up his dispute with his immediate superiors.

2. The local chairman or local committee then takes up the dispute with the division superintendent.

3. The general or regional chairman next takes up the dispute with the general superintendent.

4. The general chairman takes up the dispute with the general manager.

5. The dispute is then referred to a joint reviewing committee composed of equal representation of employees and management with equal voting power, a decision to be arrived at by two-thirds majority, and,

6. The dispute may be referred to the United States Railroad Labor Board or other public arbitrator to be decided upon by the joint reviewing committee.

Labor Leaders Attempt Formation of Political Coalition

Representatives of a large number of labor organizations and state federations of labor met at Chicago on February 20, in an endeavor to form a coalition to back candidates for public offices who will be favorable to labor legislation and to the demands of organized employees. The call to the meeting was sent out on February 8 and was signed by a committee composed of officers of various railroad labor unions. Included among the signers of the call were W. H. Johnston, International Association of Machinists; Timothy Healy, International Brotherhood of Stationary Firemen and Oilers; L. E. Shepherd, Order of Railway Conductors; Martin F. Ryan, Brotherhood of Railway Carmen; E. J. Manion, Order of Railway Telegraphers; and Warren Stone, Brotherhood of Locomotive Engineers. All except Mr. Stone were present at the meeting on February 20.

Mr. Johnston, who acted as chairman of the meeting, declared in his opening remarks that this movement "will result in retiring from public life the servants of plutocracy and privilege." According to Mr. Johnston, the coalition which has been proposed will "work through existing organizations" to place "more genuine farmers and workers as representatives * * * in our legislative halls."

Among the other railroad labor leaders who attended the meeting were T. C. Cashen, Switchmen's Union of North America; E. F. Fitzgerald, Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees, and E. F. Grable, United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers.

Pennsylvania Labor Controversy Delayed Again

The suspension of Colonel J. V. Clinnin, assistant United States district attorney at Chicago, who was assigned to the case of the Labor Board in its legal controversy with the Pennsylvania has resulted in the postponement of hearings before the United States District Court at Chicago until March 8. The developments in this case have been fully described in previous issues of the *Railway Age*.

Board Holds Hearings on Telegraphers' Rules

Hearings on proposed rules to govern the working conditions of telegraphers were held before the Board on February 21. Approximately 70 carriers have failed to agree with the telegraphers as to their working rules and all of these disputes were consolidated by the Board into one hearing. The principal points in dispute include "split tricks," overtime, basic days, scope, and punitive payment for calls, Sunday and holiday work and meals. The carriers' testimony at the opening session was largely confined to statements opposing the rules which have been proposed by representatives of the telegraphers on these subjects on the grounds that they will result in uneconomical, unjust and unreasonable conditions. Among those who testified on behalf of the carriers at the opening session were J. W. Higgins, representing 10 western carriers; M. C. McClaury, representing a group of eastern carriers; E. B. Perry, New York, New Haven & Hartford; T. A. Gregg, Atchison, Topeka & Santa Fe; W. G. Bierd, Peoria Terminal Railway; G. H. Synes and R. McIntyre, Union Pacific; H. D. Earl, Texas & Pacific; A. L. Robinson, Wabash; R. S. Henry, Nashville, Chattanooga & St. Louis and a group of southwestern roads; I. C. Clark, Chesapeake & Ohio; J. H. Owen, Florida East Coast; T. B. Turner, Louisville & Nashville; and W. R. Hensley, Louisville, Henderson & St. Louis.

E. J. Manion, president of the Order of Railroad Telegraphers, appeared on behalf of the employees, contending that procedure outlined in the Transportation Act has not been followed in these disputes and urging further conferences on working rules. He dwelt at length on the basic eight hour day, presenting several compilations to show that an eight hour day without provisions for punitive overtime after the eighth hour resulted in the extension of the working day. The subjects of "split tricks" and the scope of the proposed rules were also taken up by Mr. Manion, who argued that the former should not be permitted and that the latter should take in non-telegrapher agents and other similar employees.

Working Conditions for Firemen and Oilers

A new agreement covering the working conditions of firemen and oilers was announced by the Board on February 23 to become effective March 1. This new code extends the scope of the old national agreement, provides for the payment of pro rata rates for the ninth and tenth hours of continuous service and time and one-half thereafter, and for the working of these employees on split tricks, providing their service comes within a spread of 12 hours.

The firemen and oilers' national agreement specifically excluded employees who perform stationary engineers' work, but the new rule on this point extends the application of the new code to stationary engineers, hoisting engineers, grease cup fillers, flue blowers and borers, fire knockers, cinder pit men, fire builders and coal passers. This extension is in keeping with the demands of the firemen and oilers made during the progress of the national agreements case.

The new ruling covering intermittent service and giving the carriers the right to employ men on split tricks without punitive payments is exactly the same as the rule recently given to the clerks and reproduced in the *Railway Age* of January 28, page 277. Several additional changes are included in the new national agreement but these are of minor consequence.

The old national agreement with the firemen and oilers contained 18 rules. Of these five have been reproduced in the new code. One has been automatically changed. Ten rules relating to discipline and grievances have been remanded to the carriers and their employees for further negotiation and two have been materially changed.

Dual Flow Steam-Driven Air Compressor

THE STEAM END of the Dual Flow steam-driven air compressor recently developed by the Chicago Pneumatic Tool Company, New York City, is said to be entirely new and distinctive, yet based upon principles which have already proven their soundness and superiority in steam engine practice. The foremost feature of this machine, illustrated in Fig. 1, is the steam cylinder which is so designed and constructed that initial condensation is almost entirely eliminated, resulting in a great saving in steam power.

Initial condensation is one of the greatest preventable losses in steam engines of the old counterflow or compound type; it is caused by the cooling of the cylinder walls and head by the comparatively cool exhaust steam as it washes

over them in leaving the cylinder through the same port by which it entered. In the Dual Flow cylinder, the exhaust steam does not wash back over the cylinder walls and head, but leaves through a port in the center of the cylinder. Thus the interior surfaces of the cylinder walls and head remain at very nearly the same temperature as that of the entering steam and initial condensation is reduced to the absolute minimum.

The exhaust port is uncovered by the piston when the latter has traveled about half its stroke. The exhaust is controlled, however, by a patented, steam-tight poppet valve, which opens when the piston is near the end of its stroke and closes again (if the machine is running non-condensing) when the piston covers the port on the return stroke. When running condensing, the valve closes early in the return stroke.

The Dual Flow cylinder was designed to have several advantages over unaflow types. In the first place, a material saving in steam consumption when running non-condensing is claimed. Since the piston of a unaflow engine covers the exhaust port at the start of the return stroke, some provision must be made for preventing excessive compression. This usually takes the form of large clearance spaces. If there is any back pressure, there must be still greater clearance. Compression in the Dual Flow cylinder on the other hand does not begin until the piston has traveled half the return stroke.

A section of the cylinder, showing its construction, is given in Fig. 2. Valve leakage probably causes a greater steam loss than any other single factor. Especially is this true of installations where superheated, high-pressure steam is used; in fact, the faults common in most of the valves now used, such as leakage, excessive clearance, necessity of valve lubrication, etc., have partly offset the advantage to be derived from the use of superheated steam. Too much attention, therefore, cannot be given to the type of valve used.

A solution of the valve problem has been sought in the

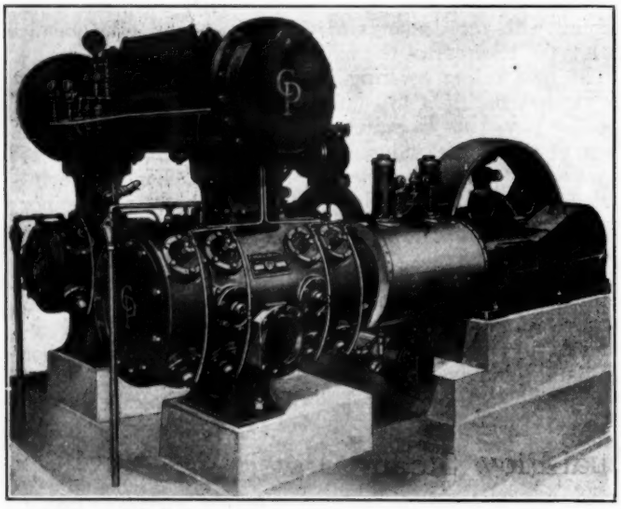


Fig. 1. General View of Dual Flow Air Compressor

case of the Dual Flow steam-driven air compressor by the adoption of the Skinner steam-tight, double-seat poppet valve for both admission and exhaust. This valve is said to remain steam tight indefinitely and seat perfectly, regardless of the pressure or temperature under which the cylinder is operated. It has been known to keep steam tight, with one grinding, with 159 lb. pressure and 150 deg. F. superheat and also with saturated steam at 100 lb. pressure. No lubrication is required.

Inequalities of expansion of the metals forming the valve and seat due to different co-efficients of expansion, are compensated for and no side thrust is imposed upon the stem by the lifting mechanism.

The governor is mounted in the flywheel and operated by centrifugal force and inertia. The governor arm is connected to the steam valve eccentric and by changing the throw of the latter it changes the point of the cut-off of the steam entering the cylinder. This method is obviously superior to the old scheme of merely throttling the steam. It is apparent that variations in speed may be made by adding or removing weights.

Unlike the old counterflow engines, which were regulated economically by slowing down during the unloaded periods of the compressor, the Dual Flow is a constant speed machine

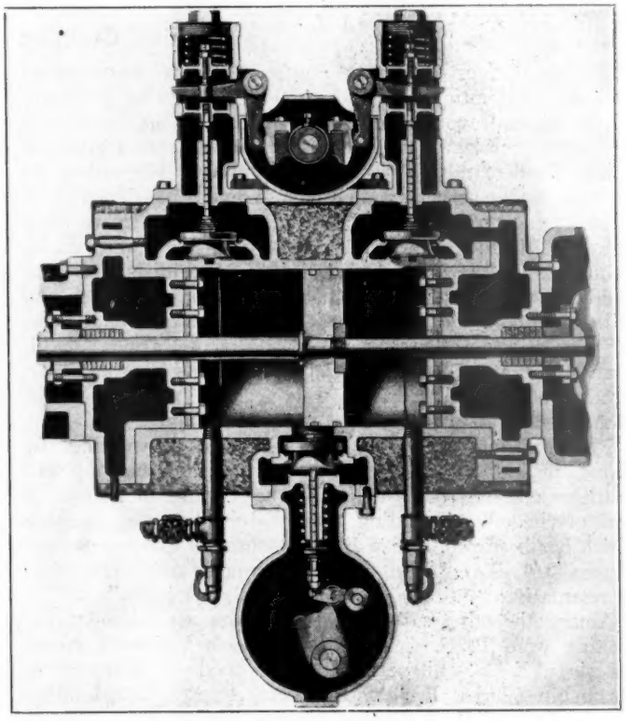


Fig. 2. Cross Section of Dual Flow Steam Cylinder

and shows the best steam economy when operating at its greatest speed. Regulation is therefore effected by two-step capacity control. Two differential unloaders connect with the inlet valves and reduce the capacity of the compressor in two steps. One unloader holds open the inlet valves on the crank end of one cylinder and the head end of the other. The second unloader holds open the inlet valves at the opposite ends. This is one of the simplest, most positive and most efficient methods of regulation known. The air valves are of the Simplate, independent disc type.

DURING THE PERIOD of 24 hours preceding 1 p. m., February 9, 264 passenger trains in-bound and out-bound were handled 100 per cent on time at the Union Station, Chicago. Fifty of these trains were operated in the hour from 7 to 8 a. m.

THE BILL TO AMEND the valuation law by omitting the requirement that the Interstate Commerce Commission shall report the cost of acquisition of land, which has been favorably reported by both the House and Senate committees, was debated in the Senate on February 21. It was brought forward on February 17 by Senator Cummins, who asked its immediate consideration. This was opposed by Senator Underwood, who asked for more time to consider it, but Senator Cummins later succeeded in having it made the unfinished business of the Senate.

Delayed by a Hot Box

Present Lubrication Methods Faulty

Positive Mechanical Oil Feed Would Reduce Friction and Wear and Minimize Equipment Delays

By J. J. Hennessy

ONE MEANS of improving net earnings always open to the railroads is to increase the efficiency of train operation, reducing the cost per unit of tonnage moved. Efforts along this line in the past have been confined largely to increasing the size and hauling capacity of locomotives and cars and the mileage made in a given period by adopting improvements such as superheaters, outside valve gears, mechanical stokers, six-wheel trucks, larger journals, etc. The method of lubricating the journals of railway equipment, especially cars, however, has not been changed, or any serious attempt made to improve it since the first railroad cars were built. It is true that the grease cellar at the time of its adoption for the lubrication of locomotive journals worked a great improvement in the performance of heavy locomotives, but an analysis of the situation at that time showed that while the use of hard grease prevented delays on the road, this was accomplished at the expense of increased wear of equipment, particularly driving journals, boxes and rods.

Oil Versus Hard Grease Lubrication

Grease of the best quality has never been considered by experienced engineers to be nearly as good a lubricant as oil. The best grease that can be manufactured for use on driving journals (this grease must necessarily be quite hard) cannot contain more than 50 per cent of oil, or pure lubricant, the rest being of questionable value except to stiffen the lubricant. Tests made on railroads in Europe and England have proved conclusively that grease is not only a poor lubricant for railway equipment journals of light cars, being injurious to journals and bearings and producing high friction, but that it is impossible to lubricate with grease a journal carrying a load greater than about 80 lb. per sq. in. of projected area where the movement in the journal box due to reversed pressure such as that experienced in a driving box from the piston thrust, is absent. Very few figures reflecting actual costs due to grease lubrication are available, but most mechanical superintendents agree that considerable expense in maintaining driving journals, boxes and rods is incurred because of the poor lubrication afforded by grease.

There is no comparison between the condition of journals and bearings lubricated with grease and those lubricated with oil from the standpoint of wear, and the life of the latter is at least three times as great as the former. In other words, a journal will run without truing three times as long when properly lubricated with oil. In the case of driving journals, greater wear is experienced in the bearings (brass) which wear so rapidly at the front and back as almost to control the length of time a large engine can be kept out of the shop. Other defects of locomotive design, formerly controlling the time an engine could be kept in service, have been overcome to such an extent that at present the excessive wear of driving box brasses with resultant pounding and rod play practically limits the mileage between repairs.

Proof that grease is not as good a lubricant as oil is had from the fact that grease will not lubricate locomotive journals other than driving journals (all of which carry less load) because of the absence of the back and forth movement of the journal in the bearing; also, an engine lubricated with grease will not run cool when not pulling a load, as when being hauled in a train.

In the light of the few experiments in improved methods of lubricating railway equipment that have been made, the increased car-carrying capacity and more economical train operation seem to warrant the most careful attention to proper lubrication. Oil of a nature most suitable for each service should be supplied in such a manner as to provide practically perfect or bath lubrication.

Bath Lubrication More Effective Than Wick Feed

Laboratory tests* made with a standard lubricant testing machine by Beauchamp Tower, and others, have shown that journal friction is reduced materially by increasing the supply of lubricant. Where oil is fed to a journal in sufficient quantity to provide an oil bath, as compared to the amount fed by capillary attraction or wick feed, the coefficient of friction is reduced from .011 to .002 using the same oil under the same laboratory conditions. Bath lubrication would produce a much greater reduction of friction under actual conditions where oil is subject to temperature variations, waste becomes glazed, and both oil and waste are filled with dirt.

In a laboratory, a journal carrying a load equal to that carried by heavy railway journals can be lubricated to produce a coefficient of friction of decidedly less than .003 and the attempt should be made to approach more nearly what can be accomplished under the most favorable conditions.

Railway journals are lubricated by the present method a small portion of the time in a manner that only approximately approaches that of the laboratory with wick feed. This is due to atmospheric conditions and the glazed condition of waste next to the journal which begins as soon after oil is applied, as the journal begins to warm up. About one-half of the period between applications of oil to the waste in the journal box of a normally loaded journal, the journal operates on a scanty supply of lubricant and this condition can be overcome only by bath lubrication or some method giving practically bath lubrication.

Advantages of Better Lubrication

Any reduction of resistance to train movement by better lubrication would have a direct bearing on coal consumption per unit moved, with an indirect bearing on train operation in general and maintenance expense. Delays because of hot boxes, and the labor and material costs involved in bearing and journal renewals, would be correspondingly reduced.

Some tests to determine resistance to car movement have been made by the Pennsylvania Railroad and reported in Bulletin No. 26. Among the resistances considered are rolling resistance of wheel on rail (influenced by type and condition of track), flange pressure on rail, wind resistance due to speed, curve resistance and grade resistance, none of which resistances can be reduced by better lubrication of journals. It is safe to assume that track and equipment conditions,

*Reported in a book entitled "Lubricants and Lubrication," by Archbutt and Dealey.

as well as the condition of packing in boxes were ideal, or in other words that the journals were lubricated in a manner superior to that obtained in ordinary railway practice. Tests with ball bearing journals on railway equipment, the improvement effected being confined entirely to eliminating resistance due to journal friction, have shown such a decrease in effort required to pull cars as to prove that about one-third of the resistance to car movement on good, ballasted level track is due to journal frictional resistance. It would seem from the figures reported in the test that six pounds per ton is required to move what might be considered an average loaded car on level track, or that six pounds per ton would be a fair figure to consider as necessary to pull an average car, considering the number of empties moved and the average loadings of box cars.

The test figures show resistance to movement of light loads and empties to be much greater per ton than with heavily loaded equipment, which further proves that resistance other than journal resistance is of small consequence. Taking two pounds per ton as the resistance due to journal friction as a basis, the coefficient of friction is easily twice as high as under the most unfavorable (wick fed) method in the laboratory. If a method more nearly approximating what should be expected of bath lubrication as shown by laboratory tests is used the journal resistance will be reduced still further. More cars can be hauled and as small a number as three cars added to each freight train of normal size means a considerable increase in revenue per train to say nothing of the decrease in maintenance cost on all cars.

As an additional advantage the carrying capacity of journals would not only be increased by more adequate and reliable lubrication, but where journal load limits with present methods are not so nearly reached, savings due to improvement in their lubrication would be reflected in reduced attention necessary and less hot box trouble when these journals are placed under heavy load. The load limits of journals are increased by proper lubrication and any increase in the carrying capacity of present journals would remove, to a great extent, the need of larger sized journals and six-wheel trucks.

Expense attributable directly to hot boxes on all classes of equipment is enormous and an investigation of the expenditure due to, or resulting from, hot boxes on any of the larger systems would show great possibilities of saving by reducing this trouble alone.

A comparison of the lubrication of railway equipment bearings with the bearings of other heavy machinery is almost impossible due to the crude method of lubricating railway journals and the conditions under which these journals operate. In spite of this fact, when the number of journals that are in service, their loads, operating conditions and the uncertainty of lubrication are considered, the comparatively small amount of trouble experienced is amazing. The success attained with the present methods is made possible by the constant attention of highly trained specialists and the unremitting perseverance of a large number of railway employees. The cost, however, is proportionately large and journals demand a much greater proportion of attention in relation to other matters pertaining to train operation than they should. It would pay to make a serious effort to bring railway journal lubrication up to a status requiring no more attention and expense than the lubrication of ordinary machinery bearings.

Oil of the Right Consistency Needed

Oil of a certain consistency is required by the present method of supplying lubricant to journals by waste feed, to insure its feeding in sufficient quantity under all atmospheric conditions. This requirement limits the lubricants to oils not always most satisfactory from a strictly lubricating standpoint. The constant disturbing of the waste by a large number of operatives, which is absolutely necessary in severe service, also increases the liability of failure and the application of oil directly to a journal does not seem to reduce this liability. With the best attention possible and the use of all the oil permissible with the present method of application, it is absolutely impossible to avoid a great deal of hot box trouble on the heavier equipment in severe service.

The inadequacy and the unreliable nature of the present method is most noticeable on equipment moving the greater portion of the time under heavy loads. Lubrication failures or hot box troubles develop on this equipment with the greatest frequency, although the inadequacy of the lubrication afforded is proportionately as great on journals carrying less loads a greater portion of the time. The tendency of these journals is to heat when placed under full load, and journal resistance is increased.

An improvement in the method of applying lubricant to such a point that oil of any desired body could be furnished to journals under all conditions, entirely independent of the capillary action of the waste in the box, would reduce the running temperature of journals under heavy load. Little tendency to heat would be noticeable, or if there was heating, it could be detected by a casual inspection and remedied before the box became hot enough to damage the bearing.

A great deal of expense is incurred by giving unnecessary attention to bearings in severe service as a result of the inability of the inspectors to determine exactly which journals are lubricated properly or which are in need of attention. The expense necessary to lubricate railway journals successfully has become accepted as unavoidable, and about the only remedy applied where trouble is experienced seems to be to increase the number of operatives giving journals inspection and attention, without any definite plan of procedure to remedy the trouble. Some positive mechanical means of supplying the lubricant to the journal should be provided and arrangements made for ready inspection. In this way the exact condition of journals can be determined and the efforts of the inspectors will not be nullified because of the impossibility of carefully inspecting all journals.

Locomotive Journal Lubrication

Locomotive driving journals are not more difficult to operate from a lubrication standpoint than the journals of cars, and their construction is such as to lend itself to the development of some more satisfactory method than that used at present. The ease and frequency with which these journals can be inspected and given attention also makes this desired improvement more easily available than in the case of other equipment.

The large diameter of a driving journal and the construction of the waste receptacle or cellar, however, makes the continuous application of sufficient oil to the entire surface of the journal difficult, and the metal of the driving bearing being harder than that of the car bearing makes it necessary that this supply of lubricant to the journal be absolutely continuous, greater damage being done by a failure of the supply of lubricant to journal for a short period.

Modern Heavy Equipment Must Be Well Lubricated

The general adoption of the hard grease method of lubricating locomotive driving journals was largely the result of a determination to eliminate road delays on account of lubrication failures and entirely regardless of the expense incurred by excessive journal wear, frictional resistance and resultant deterioration of other locomotive parts. None of these effects were as noticeable, or of as great consequence, on the locomotives in general use at that time, as with the larger locomotives of the present day. Increases in the size of locomotives, with improvement in their design and construction, permits capacity operation a greater portion of the time and emphasizes the inadequacy of journal lubrication, focusing

attention on repairs directly necessitated by poor lubrication.

Repairs to driving boxes and parts directly affected by the condition of driving boxes are the principal causes of locomotives being kept out of service between general overhaulings. While the increase in carrying area of driving journals has about kept pace with the increase in locomotive size, no provision has been made to take care of the greater thrust of piston, and wear at the front and back of driving brasses has become more noticeable. This excessive wear of brasses aids, to a certain extent, the lubrication of the journals provided with grease cellars by permitting a greater movement of the journals back and forth in the boxes, without which satisfactory lubrication with grease is impossible. This movement is much more detrimental to the larger equipment and it becomes more desirable to reduce it to a minimum, which in turn reduces the lubrication afforded by the grease. Moreover, the larger cylinders and heavier wheels bring the centers of the driving boxes further from the centers of the crank pins and closer together, still further adding to the necessity for reducing this movement as well as increasing the need of lubricating the journals properly.

It would seem that a driving box would eventually be developed to provide a greater area to take piston and rod thrust by having the bearing extend down below the center line of the journal. This construction would necessitate oil lubrication with some positive means of application, as restriction of this movement to only that required for proper operation of the journal with oil lubrication would make it impossible to lubricate satisfactorily with grease. Any improvement along this line would show beneficial results, especially on the heavy equipment, and hasten the adoption of some positive mechanical means of supplying oil of any desired consistency to journals of all classes of railway equipment in an absolutely reliable manner.

Freight Car Loading

THE LOADING of revenue freight continued through the week of February 11 the increase which has been shown each week since the first of the year, according to the weekly report of the Car Service Division of the American Railway Association. The total was 788,412 cars, as compared with 687,867 in the corresponding week of last year and 786,663 in 1920. This is the first week for a long time in which the loading exceeded the corresponding week of 1920. The increase as compared with the previous week was 34,000 cars. Increases as compared with the corresponding week of 1921 were shown in the loading of all classes of commodities except coke, forest products, and ore.

The freight car surplus showed another large drop during the week ending February 8 to 296,659, a decrease of 34,022. There were 121,528 surplus box cars and 123,119 surplus coal cars.

The number of bad order cars on February 1 was 331,050, or 14.5 per cent, an increase of 11,538 as compared with the number on January 15.

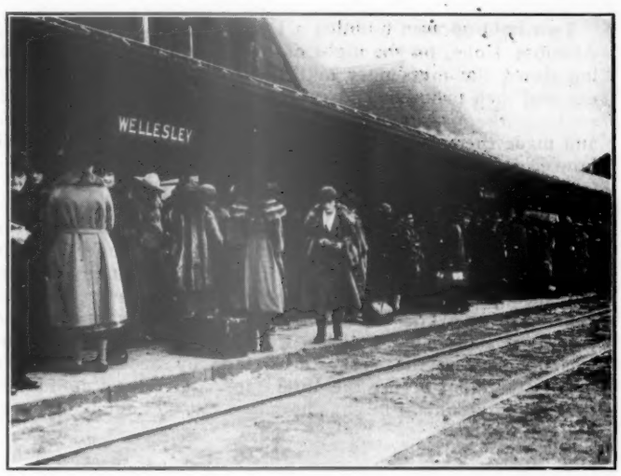


Photo by Underwood & Underwood

A Typical Scene at the Station at Wellesley, Mass., Upon the Occasion of a School Holiday

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO—WEEK ENDED SATURDAY, FEBRUARY 11, 1922

District	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded: This year 1922	Corresponding year 1921	Corresponding year 1920
Eastern	1922	10,939	2,785	47,135	1,698	5,935	633	63,540	62,415	195,080	.....	.....
	1921	6,127	2,902	43,120	1,131	8,517	838	47,928	51,919	.....	162,482	171,546
Allegheny	1922	2,827	2,573	55,744	3,887	2,881	554	45,928	46,822	161,216	.....	.....
	1921	1,687	2,872	45,575	5,270	2,575	2,569	37,897	44,289	.....	142,734	161,164
Pocahontas	1922	251	68	25,250	235	961	20	5,530	3,194	35,509	.....	.....
	1921	167	94	13,753	343	1,258	51	4,267	2,433	.....	22,366	32,983
Southern	1922	5,441	2,389	26,007	576	15,242	589	36,913	34,428	121,585	.....	.....
	1921	3,098	1,796	21,757	649	12,629	937	34,112	33,136	.....	108,114	125,950
Northwestern	1922	13,739	9,231	9,699	1,033	15,471	397	25,429	26,845	101,844	.....	.....
	1921	9,730	8,123	6,006	1,617	18,002	982	23,831	27,167	.....	95,458	114,748
Central Western	1922	17,034	10,929	22,825	252	4,544	900	29,819	28,794	115,097	.....	.....
	1921	9,299	10,086	16,570	292	3,684	2,316	28,975	28,462	.....	99,684	118,018
Southwestern	1922	5,683	2,299	5,507	142	7,604	922	15,749	20,175	58,081	.....	.....
	1921	4,549	1,770	4,596	96	6,470	401	16,155	22,992	.....	57,029	62,224
Total, all roads	1922	55,914	30,274	192,167	7,823	52,638	4,015	222,908	222,673	788,412	.....	.....
	1921	34,657	27,643	151,377	9,398	53,135	8,094	193,165	210,398	.....	687,867	.....
	1920	35,579	28,782	188,371	9,977	61,712	12,183	137,577	312,452	.....	.....	786,633
Increase compared	1921	21,257	2,631	40,790	.....	.....	.....	29,743	12,275	100,545	.....	.....
Decrease compared	1921	.....	.....	.....	1,575	497	4,079	.....	.....	.....	.....	.....
Increase compared	1920	20,335	1,492	3,796	.....	.....	.....	85,331	.....	1,779	.....	.....
Decrease compared	1920	.....	.....	.....	2,154	9,074	8,168	.....	89,779	.....	.....	.....
February 11	1922	55,914	30,274	192,167	7,823	52,638	4,015	222,908	222,673	788,412	687,867	786,633
February 4	1922	48,969	27,998	185,151	7,844	50,204	4,015	218,571	211,134	753,886	699,718	762,680
January 28	1922	50,880	32,590	180,966	7,502	47,373	4,007	211,466	208,944	743,728	701,605	803,332
January 21	1922	52,181	31,961	164,091	7,267	50,328	4,269	213,642	214,536	738,275	708,658	804,866
January 14	1922	50,187	36,165	159,245	7,258	48,490	4,451	205,546	209,536	720,877	715,855	840,524

General News Department

The Boston & Maine has decided to sell advertising space in passenger cars and in station buildings and has made a contract with George W. Roebling, advertising agent, of New York.

L. M. Parker, secretary to Mr. Hooper of the United States Railroad Labor Board and at one time adjutant of the Soldiers' Home at Hampton, Va., has been appointed secretary of the Board, succeeding C. P. Carrithers. W. M. Hart, assistant statistician of the Board, has been appointed chief statistician, succeeding V. J. Banzer.

Two hold-up men boarded a Denver & Rio Grande train at Alamosa, Colo., on the night of February 18, and after shooting down the messenger in the express car, ransacked that car and then proceeded to go through the passenger coaches, robbing the passengers. The men then stopped the train and made their escape. The express messenger was seriously injured and is not expected to recover.

A. W. Mellon, secretary of the treasury, has issued a statement saying that newspaper reports to the effect that he approves of a plan to give a government guaranty to issues of railroad equipment obligations are without foundation. No such plan has ever been presented to the treasury for consideration. This statement was called forth by the publication of newspaper articles which stated that the Cabinet was considering the suggestion, made by Secretary Hoover in his statement before the Interstate Commerce Commission, that the government might guarantee railroad equipment trust obligations.

Historic Iron Box Car Wrecked in Blast

Box Car No. 90190, of the Nashville, Chattanooga & St. Louis was destroyed by the explosion of a case of dynamite at Hollow Rock Junction, Tenn., last week. This car was the first metal box car ever used in the Southern States. It was commandeered by General Sherman as an ammunition carrier in his advance on Atlanta, in 1864.

The Pere Marquette's Budget for 1922

The proposed new shops of the Pere Marquette at Wyoming (Grand Rapids), Mich., constitute the largest item in the budget of that road for 1922, which amounts to $4,035,000. For the construction and equipment of the shops the allotment is $1,400,000. Other improvements include the completion of the Flint Belt line; the installation of a telephone dispatching system between Grand Rapids and Petoskey, and between Holland and Pentwater; $100,000 for two bridges which will ultimately represent an outlay of $700,000; and $1,300,000 for ballasting and rail requirements.

Music at Sacramento Shops

Employees of the Southern Pacific shops at Sacramento, Cal., are having great success with their musical organizations, consisting of a 38-piece band and a glee club of 48 voices. These have been developed at the shops and have attracted favorable attention in many sections of the state during the last few years. Although organized as recently as 1917, during the Liberty Loan drives, the organizations have made great strides. In a little over four years these two organizations, which are under the direction of J. E. Weida, foreman of locomotive machine shop No. 1 at Sacramento, have raised over $14,000 for charitable purposes, have built up a music library valued at over $3,000, and have equipped themselves with uniforms valued at several thousand dollars.

One of the customs of the glee club which has brought the members much favorable notice is their Christmas carol singing. On Christmas morning at five o'clock the club makes the rounds of all the hospitals, city and county jails, homes of shop employees who have been sick, and to any place where it is felt that music would bring cheer.

Frisco Votes $7,776,000 Improvements

The St. Louis-San Francisco has authorized an expenditure of $7,776,000 in 1922, for repairing and modernizing cars and locomotives, purchasing new equipment, and in improving the road and its facilities. The appropriation for new equipment is $1,260,000, and that for the repair and improvement of existing equipment approximately $3,072,500. An appropriation of $1,691,000 has been set aside for laying 186 miles of track, including new second main track out of St. Louis and Kansas City. Other improvements to roadway will take approximately $1,500,000.

Reading Conductor and Engineman Convicted

Conductor Evans and Engineman Yeakel, the men immediately responsible for the fatal collision on the Philadelphia & Reading at Woodmont, Pa., on December 5, when 27 persons were killed, were tried in court at Norristown, Pa., last week, and were convicted of criminal negligence; the maximum penalty for which is five years' imprisonment or $5,000 fine, or both. The men were released on bail of $5,000 each, pending application for a new trial. The verdict of the jury included a recommendation for mercy. According to press reports, the jury, in which were two women, balloted for twenty hours before reaching a decision, 200 ballots being cast.

Ticket Clerks

H. L. Hungerford, superintendent of the Charlotte division of the Southern Railway, in a letter headed as above and circulated among "whom it may concern" gives some condensed advice as follows:

"About nine-tenths of any traveler's opinion of a railroad is made at the ticket window. The reception they get there, the way they are handled, the way they are taken care of, go far towards establishing what travelers will think of that railroad.

"The ticket clerk's job is not an easy one. He has to be a diplomat and a gentleman, he has to have tact and patience and an easy working smile.

"You have to remember that you are never doing a person a favor to sell him a ticket. If people find it difficult or unpleasant to do business at the ticket window that is a sure sign of a poor ticket clerk. Think of the men and women who come to you as being your guests in your house. They are invited to come; and they have every right to expect courteous and cordial interest in their wants.

"If you can't meet and care for people in this spirit; if you can't or won't be courteous, and helpful and gracious and pleasant at every step of your work; and with your fellow employees as well as with the public—*Don't try to be a ticket clerk.*"

Mine and Rail Unions Meet

The joint conference of representatives of the larger railroad labor organizations and the United Mine Workers of America, scheduled for February 21, was held on February 22 and resulted in the adoption of a "toothless" protective agreement for "closer co-operation of forces which will operate to protect more effectively the interests of workers in mining and transportation."

While the meeting was held behind closed doors, reliable reports of the developments were circulated. One of these reports quoted Quilliam Green, secretary-treasurer of the miners' or-

ganization, as saying, "It is not what we do in this meeting but what the public believes we can do that is important. If the public believes we can form a working co-operating alliance, the public will force operators to grant our demands."

The substance of the resolution adopted at the conference is contained in the following:

"After mature deliberation and with a full sense of our responsibility we declare that the mutuality of interests of the employees in these basic industries must be recognized and we assert our purpose to apply every honorable method to secure adequate compensation for service rendered and to maintain proper American standards of living. When it becomes apparent that any one or group of the associated organizations is made the victim of unwarranted attacks or its integrity is jeopardized, it will become the duty of the representatives of each of the associated organizations to assemble to consider the situation. Ways and means may then be considered and applied to best meet the emergency. Action taken under this section is subject to approval by each organization represented. This plan shall become operative when ratified by the constitutional authorities of each associated organization."

A. R. E. A. Program

The program for the twenty-third annual convention of the American Railway Engineering Association, which will be held in the Congress Hotel, Chicago, on March 14-16, is as follows:

Tuesday, March 14

President's address.
Reports of secretary and treasurer.
Reports of standing and special committees.
Yards and Terminals.
Electricity.
Ballast.
Iron and Steel Structures.
Standardization.
Signals and Interlocking.
Ties.
Track.

Wednesday, March 15

Shops and Locomotive Terminals.
Roadway.
Economics of Railway Location.
Stresses in Railroad Track.
Records and Accounts.
Signs, Fences and Crossings.
Water Service.
Uniform General Contract Forms.
Annual dinner at 6:30 P. M.

Thursday, March 16.

Masonry.
Rail.
Economics of Railway Labor.
Wooden Bridges and Trestles.
Economics of Railway Operation.
Buildings.
Wood Preservation.
Rules and Organization.
Memorial Meeting—John Findley Wallace.
New business.
Election and installation of officers.
Adjournment.

Friday, March 17.

Excursion to Gary Industrial District.

March Meeting of Signal Section

F. B. Wiegant, chairman, and H. S. Balliet, secretary, announce that the ninth meeting of the Signal Section of the American Railway Association will be held at the Drake Hotel, Chicago, on Monday and Tuesday, March 13 and 14. The committee reports to be considered at this meeting are as follows:

Committee I—General provisions for major specifications. Committee II—Specifications for concrete trunking, capping and supports; for universal compensation of pipe line and for mechanical interlocking; also three drawings. Committee III—Specifications for electric wiring for interlocking plants. Committee IV—(Direct current automatic block signaling); requisites for circuits; approach lighting of signals. Committee V—Rules for signal maintenance and examination papers on signal maintenance. Committee VI—Seven revised standard drawings.

Committee VII—Tables of standard resistances of direct current relays, with their operative characteristics. Committee X—Report on colors for signals. Committee XI—Specifications for storage battery jar and for cement concrete battery box. Committee XII—(Contracts.) Table of interlocking units and values.

Committee XIII—(Electrical Testing.) Instructions for inspecting and testing direct current relays and indicators. Method of testing first range d. c. bottom of mast, upper quadrant, motor signals, push clear type, in service. Method of testing first range, upper quadrant, d. c. motor signals, top mast or bottom of mast type, having pull clear connections. Committee XV—(Valuation.) Table of average service life of the important units of the different types of signal installations. Forms for reporting distribution of signal labor and material charges and credits. Committee XVI—Specification for illuminating Oil No. 5003.

Committee XVIII—Discussion of factors involved in the standards of safety for track circuits. Methods of making d. c. track circuit tests for rail and ballast resistance with forms for recording same. Committee XX—(Highway crossing protection.) Twelve recommendations.

Proposed Legislation to Regulate Aeronautic Industry

The Board of Directors of the Chamber of Commerce of the United States has authorized its Department of Transportation and Communication to interest itself actively in urging broad enabling legislation in commercial aeronautics. The department committee recommends in principle the immediate support of basic national legislation on aeronautics providing for a proper regulatory procedure in the nature of an enabling act providing for the continuation, administration and improvement from time to time of an aeronautical code under proper government authorization, adequate facilities within the Department of Commerce for promoting the regulation and development of commercial air transport operations, intrastate state legislation to conform as nearly as possible to the basic federal legislation, and encouragement of widespread public support of essential aeronautical legislation.

The department's statement says that through lack of legal and economic status aviation is not receiving the practical encouragement it deserves, as a most powerful arm of national defense and as a new transportation agency of great potentiality. The aeronautic industry is the only important case on record of a new industry asking to be regulated from the inception of its operations, whereas the regulation of rail transportation and public utilities have been developed under public pressure.

"During 1920, the Army air service flew 6,250,000 miles; Navy air service, 1,500,000 miles; Air mail, 1,500,000 miles; total, 9,250,000 miles, excluding private and commercial flying. The Manufacturers' Aircraft Association reports 15 commercial companies with over 130 planes in service carrying 86,000 passengers with a gross revenue of over $800,000. The post office department reports that including the calendar year 1920, the Air mail carried 41,000,000 letters, with an operating cost of $1,340,000, equal to about $1 per plane-mile, or slightly exceeding three cents per letter. In the fiscal year 1920-21, the Air mail flew 1,771,000 miles, reducing the cost to 85 cents per plane-mile, carrying an average of 400 pounds per plane. Since the last change in government administration, all air-mail routes have been discontinued, except the New York-Chicago-San Francisco route, due to limited appropriations.

"Yet we find that Europe now has scheduled air service (passenger, mail and freight) between 30 or 40 principal commercial centers. Service runs by time-table, with efficiencies reported on some routes as high as 90 to 98 per cent of scheduled flights run. Europe has largely developed commercial aviation, while America has concentrated on the Air mail. The United States Air mail mileage last year exceeds the commercial mileage of both Britain and France, but our commercial mileage is hardly comparable: * * * Air subsidies in Europe have been important accelerators of commercial air transport. England has granted about $1,000,000 per year for a three-year period. Government aircraft are operated privately under rental contract. France has given large subsidies. Canada is operating under approximately the International Code and had nearly 500 licenses in force last fall."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921

Name of road.		Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	Dec.	141	$194,713	$66,271	$268,055	$55,797	$43,842	$11,304	$144,392	$10,945	$263,175	98.20	$4,880	—$17,534	—$17,433	$31,201
	12 mos.	141	2,454,769	725,275	3,394,210	604,918	667,412	100,438	1,514,957	139,080	3,052,105	89.90	342,105	109,782	145,860	145,873
Vicksburg, Shreveport & Pacific	Dec.	171	220,838	98,552	341,460	63,787	49,208	12,088	181,031	13,284	318,425	93.20	23,035	1,949	—14,521	29,597
	12 mos.	171	2,825,942	1,081,234	4,155,637	694,633	743,273	119,556	1,666,379	161,856	3,415,911	82.20	739,726	527,648	352,299	295,285
Ann Arbor	Dec.	293	366,798	47,162	430,332	78,079	15,108	8,207	186,626	14,169	302,189	70.20	128,143	90,168	58,210	84,904
	12 mos.	293	4,273,676	625,830	5,139,215	671,732	1,010,696	99,544	2,269,144	167,445	4,218,811	82.10	920,404	663,679	490,382	—127,891
Atchison, Topeka & Santa Fe	Dec.	8,863	8,348,899	3,515,052	13,645,282	1,550,109	3,412,679	305,312	5,416,310	366,400	11,001,764	80.60	2,643,518	1,593,847	1,798,809	1,017,161
	12 mos.	8,833	129,276,475	45,875,819	189,217,520	18,084,559	38,892,812	3,140,880	66,766,644	4,280,814	130,774,167	69.10	58,443,353	44,693,067	46,234,261	26,582,353
Gulf, Colorado & Santa Fe	Dec.	1,907	1,428,376	363,438	1,932,410	443,313	520,200	50,138	762,659	59,284	1,828,074	94.60	104,336	38,019	—847	198,486
	12 mos.	1,907	23,342,800	4,613,229	29,209,224	4,300,010	6,127,658	493,820	9,628,052	864,501	21,364,113	73.10	7,845,111	6,991,082	6,339,396	—1,072,262
Panhandle & Santa Fe	Dec.	857	506,477	125,144	681,722	90,401	237,774	10,254	342,181	28,532	704,582	103.35	—22,860	—72,505	—98,586	—63,475
	12 mos.	857	7,407,430	1,639,906	9,531,957	608,000	2,693,645	82,265	3,369,164	249,097	6,998,239	73.42	2,533,718	2,256,787	1,877,411	—1,170,251
Atlanta, Birmingham & Atlantic	Dec.	639	240,257	43,708	306,200	68,730	82,293	19,530	236,345	15,860	422,828	138.10	—116,628	—145,871	—174,901	—96,323
	12 mos.	639	2,505,421	437,546	3,201,634	923,344	1,143,557	248,737	2,152,375	191,716	4,660,664	145.60	—1,459,030	—1,697,428	—1,774,150	—1,352,586
Atlantic Coast Line	Dec.	4,917	4,261,347	1,475,112	6,075,617	906,169	1,301,578	103,715	2,511,968	133,887	4,988,383	82.10	1,087,234	812,388	706,212	1,969,144
	12 mos.	4,893	44,391,548	16,783,208	66,552,681	9,866,947	15,049,528	1,161,196	30,516,878	1,683,572	58,655,584	88.10	7,897,097	4,725,768	4,192,835	1,380,454
Atlanta & West Point	Dec.	93	88,100	72,357	171,637	29,512	46,030	9,195	65,556	12,263	165,291	96.30	6,346	16,032	8,740	—40,263
	12 mos.	93	1,223,709	939,725	2,470,655	332,480	557,825	96,980	993,183	133,909	2,159,608	87.40	311,047	190,696	130,623	370,053
Western of Alabama	Dec.	133	117,874	65,597	201,250	42,549	55,435	9,345	63,727	11,380	185,152	92.00	16,098	—3,719	—3,833	—36,355
	12 mos.	133	1,442,769	845,461	2,530,457	385,713	659,825	97,651	887,943	132,267	2,201,335	87.00	329,122	217,359	222,010	290,639
Charleston & Western Carolina	Dec.	342	198,254	45,850	255,304	85,572	55,267	7,718	143,653	10,965	303,245	118.80	—47,941	—39,428	—64,820	—23,124
	12 mos.	342	2,594,325	508,995	3,276,543	812,918	796,127	78,690	1,642,592	89,607	3,419,898	104.40	—143,355	—247,460	—366,368	—644,857
Baltimore & Ohio	Dec.	5,184	12,149,470	2,130,228	15,504,563	2,327,865	3,370,889	290,925	6,332,476	522,730	12,964,462	83.60	2,540,101	2,021,738	1,653,252	—436,880
	12 mos.	5,184	156,421,213	29,331,034	198,622,373	24,617,808	45,129,857	3,301,677	85,481,387	6,385,388	166,457,024	83.80	32,165,349	24,886,985	21,853,547	—4,466,041
Baltimore & Ohio Chicago Term	Dec.	90	.....	.....	208,890	93,517	42,225	1,695	123,898	14,851	281,338	134.70	—72,448	—110,806	—26,783	5,488
	12 mos.	90	.....	.....	2,628,783	497,701	445,700	17,754	1,620,990	157,082	2,790,755	106.20	—161,972	—621,124	535,859	—415,419
Staten Island Rapid Transit	Dec.	23	81,152	85,762	181,749	38,076	23,960	1,447	115,804	24,156	203,443	111.90	—21,694	—40,049	—52,084	—58,276
	12 mos.	23	1,024,250	1,228,535	2,511,467	542,030	298,180	22,391	1,498,735	179,222	2,540,558	101.20	—29,091	—226,223	—367,013	—711,911
Bangor & Aroostook	Dec.	660	526,643	86,986	638,024	38,135	147,922	4,706	188,847	18,949	399,376	62.60	238,648	194,455	199,251	—87,637
	12 mos.	660	6,127,458	956,320	7,348,709	1,192,468	1,768,400	52,815	2,538,523	235,621	5,838,452	79.40	1,510,257	1,095,782	1,215,764	707,252
Belt Ry. Co. of Chicago	Dec.	31	.....	.....	436,432	28,615	54,096	1,351	210,306	10,650	304,418	69.80	132,014	98,763	129,789	127,873
	12 mos.	31	.....	.....	5,495,789	595,979	683,189	13,144	2,606,055	130,393	4,028,760	73.30	1,467,029	1,126,708	1,599,985	1,591,708
††Bessemer & Lake Erie	Dec.	225	641,196	38,021	697,074	178,693	289,312	13,630	281,778	29,239	441,487	63.30	255,587	244,421	287,522	—824,985
	12 mos.	225	12,800,258	474,910	13,534,011	1,594,234	4,843,128	189,112	4,266,629	336,204	11,299,377	83.50	2,234,634	1,852,268	2,253,227	4,794,376
Bingham & Garfield	Dec.	35	11,208	10	11,380	21,561	3,408	798	5,126	4,631	35,542	312.30	—24,162	—31,850	—28,914	—37,952
	12 mos.	35	165,106	3,696	178,322	235,951	53,104	16,350	90,699	48,011	444,940	249.50	—266,618	—342,280	—293,783	320,817
Boston & Maine	Dec.	2,300	3,711,744	1,879,611	6,141,592	847,324	1,243,932	45,318	3,461,735	198,403	5,823,732	94.80	317,860	415,794	165,396	—75,657
	12 mos.	2,300	47,660,965	23,640,396	78,289,750	13,021,679	15,920,612	710,784	40,968,464	2,918,095	73,833,472	94.30	4,456,278	1,780,528	—1,401,770	—11,918,220
Brooklyn Eastern District Term	Dec.	9	99,100	.....	107,059	6,729	18,499	733	40,724	6,575	73,260	68.40	33,799	27,505	27,505	17,189
	12 mos.	9	1,234,633	.....	1,318,073	109,014	235,111	3,384	488,890	76,812	913,211	69.30	404,862	325,946	325,966	—168,572
Buffalo & Susquehanna	Dec.	254	151,200	7,628	163,773	34,306	59,990	2,254	59,617	13,393	169,560	103.50	—5,787	—2,954	22,328	69,572
	12 mos.	254	1,925,639	79,699	2,052,733	459,587	985,632	31,332	750,525	124,639	2,351,715	114.70	—298,982	—332,529	70,325	257,439
Buffalo, Rochester & Pittsburgh	Dec.	589	1,024,948	158,714	1,239,678	88,905	412,485	16,600	510,992	34,980	1,065,310	85.90	174,368	176,539	157,140	136,183
	12 mos.	589	11,962,147	1,794,910	14,399,526	1,977,389	4,939,769	215,636	6,272,275	482,603	13,917,032	96.60	482,494	133,146	735,691	1,663,772
Canadian Pacific Lines in Maine	Dec.	233	256,037	38,342	310,737	22,095	49,732	4,813	139,958	4,594	221,192	71.20	89,545	63,470	73,723	—21,869
	12 mos.	233	2,094,339	515,208	2,808,902	531,275	553,579	46,754	1,419,049	48,321	2,598,978	92.50	209,924	6,849	—136,889	—888,753
Carolina, Clinchfield & Ohio	Dec.	291	526,648	41,208	575,054	75,925	129,817	23,032	149,575	19,216	397,010	69.00	178,044	153,440	225,189	247,579
	12 mos.	291	6,790,147	522,693	7,464,112	979,799	1,740,747	269,117	2,084,818	250,255	5,320,171	71.30	2,143,941	1,702,140	2,492,298	2,489,561
*Central of Georgia	Dec.	1,913	1,040,731	444,209	1,605,673	210,069	366,493	64,534	745,222	77,856	1,469,544	91.50	136,129	88,552	128,842	—507,073
	12 mos.	1,913	14,684,070	5,484,705	22,185,359	3,531,515	4,817,864	772,125	9,884,357	949,686	20,033,556	90.30	2,151,803	1,230,732	1,343,151	—1,553,192
Central of New Jersey	Dec.	685	3,250,525	710,690	4,136,735	474,422	1,799,853	35,878	1,714,387	112,966	4,160,008	100.60	—23,273	—111,732	—76,469	—1,405,170
	12 mos.	685	40,306,297	9,679,220	52,660,997	6,430,108	13,528,793	423,473	21,709,385	1,293,735	43,621,696	82.80	9,039,301	6,206,015	5,998,782	—6,029,079
Central Vermont	Dec.	413	394,161	84,219	529,471	59,459	114,225	8,982	228,713	23,491	436,516	82.40	92,955	85,751	70,041	—177,068
	12 mos.	413	4,835,036	1,228,907	6,633,401	1,145,046	1,569,251	133,939	3,745,111	257,396	6,868,706	103.50	—235,305	—465,790	—665,160	—1,627,128
Chesapeake & Ohio	Dec.	2,548	4,289,724	862,605	5,509,973	1,005,346	1,256,744	71,973	1,988,789	157,626	4,489,580	81.50	1,020,393	982,222	1,460,419	1,155,962
	12 mos.	2,546	67,372,970	11,741,629	83,684,027	12,261,842	19,884,366	800,593	31,522,098	1,977,163	66,644,890	79.60	17,039,137	14,452,513	13,657,967	11,158,325
Chicago & Alton	Dec.	1,050	1,602,234	540,222	2,473,556	320,633	379,882	53,079	1,040,438	65,982	1,878,529	75.90	595,027	493,936	354,182	—278,319
	12 mos.	1,050	22,202,102	6,830,639	31,049,259	4,437,274	8,128,332	626,511	12,194,849	732,458	26,202,540	84.40	4,846,710	3,809,855	2,134,004	—278,319
*Chic., Detroit & Canada Gr. Tr. Jct.	Dec.	62	242,458	10,944	272,973	15,268	34,055	3,096	103,949	4,335	160,669	58.90	112,304	103,740	77,319	41,132
	12 mos.	62	1,799,971	165,029	2,066,186	221,524	275,412	32,262	895,271	54,611	1,480,054	71.60	586,132	454,206	203,457	82,616
Chicago & Eastern Illinois	Dec.	1,128	1,473,654	423,368	2,020,893	242,869	439,210	46,886	876,530	113,661	1,731,642	85.70	289,251	169,096	108,608	320,223
	12 mos.	1,130	20,282,431	5,051,669	27,099,146	2,772,461	8,572,405	441,522	11,163,435	838,654	23,944,405	88.40	3,154,741	1,938,681	2,153,582	2,128,214
Chicago & North Western	Dec.	8,402	6,482,438	2,592,647	10,578,608	1,576,968	2,458,692	127,380	6,117,278	319,611	10,670,953	100.90	—92,345	—488,570	—509,787	—559,303
	12 mos.	8,402	95,687,013	33,770,082	144,775,476	21,418,925	33,056,791	1,876,730	67,636,774	4,215,437	129,091,428	89.20	15,684,048	7,201,883	6,651,137	—1,609,232
Chicago, Burlington & Quincy	Dec.	9,393	9,060,125	2,249,549	13,315,581	2,351,955	3,323,307	152,823	5,050,826	297,558	10,584,366	79.50	2,731,215	1,988,429	2,000,866	—1,918,614
	12 mos.	9,393	122,650,745	31,393,205	168,643,539	23,103,902	34,290,506	2,102,820	63,577,937	4,637,992	128,416,345	76.10	40,227,194	30,430,729	28,696,588	8,100,104
Chicago Great Western	Dec.	1,496	1,175,170	369,577	1,687,405	311,535	522,427	60,442	858,008	57,836	1,823,084	108.00	—135,679	—219,048	—336,524	—46,372
	12 mos.	1,496	17,577,932	4,885,268	24,273,653	3,685,783	5,216,771	777,729	10,422,714	704,925	20,989,981	86.50	3,283,672	2,382,086	812,751	—2,673,310
Chicago, Indianapolis & Louisville	Dec.	657	842,250	251,259	1,210,256	119,291	194,975	28,070	437,266	33,737	827,235	68.40	383,021	320,569	246,868	—70,544
	12 mos.	656	10,623,369	3,226,886	15,162,870	1,632,396	3,725,448	365,795	5,866,981	423,920	12,190,664	80.40	2,972,206	2,234,206	1,269,873	—1,010,841

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
						Maintenance of										
			Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Chicago Junction	Dec.	12	.....	.....	$439,973	$35,350	$19,476	$670	$156,203	$14,115	$825,814	51.30	$214,159	$188,599	$259,400	$27,151
	12 mos.	12	.....	.....	5,261,832	725,545	461,389	4,743	2,364,845	164,875	3,721,397	70.70	1,540,435	1,192,631	2,050,779	—1,315,798
Chicago, Milwaukee & St. Paul	Dec.	11,030	8,027,858	2,001,485	11,347,782	1,094,333	2,772,057	178,973	5,676,320	348,621	10,140,933	89.40	1,206,849	447,252	30,290	403,248
	12 mos.	10,808	104,894,848	26,915,456	146,765,766	17,987,292	35,543,850	2,093,164	66,879,327	4,572,617	127,957,002	87.20	18,808,764	9,763,129	5,117,329	—15,253,156
Chicago, Peoria & St. Louis	Dec.	247	158,611	25,715	197,358	40,626	68,495	5,202	123,886	11,067	249,276	126.30	—51,918	—65,337	—86,296	—75,041
	12 mos.	247	1,695,629	298,239	2,113,416	381,001	620,663	56,484	1,270,023	138,591	2,466,762	116.70	—353,346	—483,542	—607,537	—620,672
Chicago, Rock Island & Pacific	Dec.	7,661	6,328,233	2,235,726	9,538,005	1,879,443	870,370	177,373	4,539,270	227,568	7,735,893	81.10	1,802,112	1,464,720	1,350,697	535,476
	12 mos.	7,661	93,196,645	29,378,741	131,766,857	19,663,857	27,591,355	2,079,753	54,325,295	2,914,879	107,170,332	81.33	24,596,525	19,049,040	15,198,454	1,466,882
Chicago, Rock Island & Gulf	Dec.	461	332,521	83,781	469,930	73,008	90,117	12,929	270,217	14,019	461,193	98.10	8,737	9,276	—15,229	137,082
	12 mos.	461	5,810,619	1,200,549	7,510,255	1,125,143	980,195	157,843	3,317,545	183,220	5,777,928	76.90	1,732,327	1,603,754	1,264,775	860,313
Chicago, St. Paul, Minn. & Omaha	Dec.	1,749	1,368,787	509,575	2,106,305	283,474	410,640	30,631	1,191,344	75,786	1,998,345	94.90	107,960	336,354	331,613	102,550
	12 mos.	1,749	19,213,297	6,857,046	28,047,675	3,640,525	5,714,397	407,835	13,699,320	932,142	24,519,423	87.40	3,528,252	2,232,481	1,842,852	1,641,496
Cin., Indianapolis & Western	Dec.	321	245,960	52,366	321,534	51,541	61,643	9,798	156,346	19,988	302,373	94.10	19,161	11,770	—692	—11,608
	12 mos.	321	2,826,527	685,076	3,716,572	742,807	1,136,067	136,713	1,845,442	250,307	4,148,136	111.60	—431,564	—585,920	—728,403	—751,973
Colorado & Southern	Dec.	1,099	775,057	158,652	1,023,230	181,931	317,249	12,123	400,326	47,707	976,605	95.40	46,625	43,892	34,394	748,923
	12 mos.	1,099	9,897,761	2,394,204	13,223,220	1,993,464	2,981,457	146,129	4,703,027	603,157	10,523,890	79.60	2,699,330	1,932,715	1,903,795	2,835,102
Ft. Wayne & Denver City	Dec.	454	572,414	211,586	828,039	122,523	201,621	10,889	289,397	33,858	663,235	80.10	164,804	146,099	169,357	59,859
	12 mos.	454	8,027,523	2,725,418	11,334,956	1,190,047	2,096,647	136,825	3,590,665	426,904	7,512,205	66.30	3,822,751	3,434,988	3,457,112	884,885
Wichita Valley	Dec.	255	89,281	29,555	127,004	28,497	8,970	35	50,257	1,384	89,143	70.20	37,861	33,951	22,607	14,815
	12 mos.	255	1,269,502	362,132	1,723,109	315,684	138,497	407	624,865	19,317	1,097,986	63.70	625,123	554,650	414,403	136,790
Columbus & Greenville	Dec.	226	98,019	46,600	153,409	31,972	10,228	1,803	58,241	7,229	109,296	71.30	44,113	51,258	32,214	—19,791
	12 mos.	250	1,119,996	375,722	1,594,291	428,547	216,451	33,365	796,879	78,438	1,553,430	97.40	40,861	—83,275	—348,271	—754,466
Delaware & Hudson	Dec.	887	3,286,080	267,817	3,730,725	759,164	1,106,749	39,203	1,425,114	154,935	3,510,721	94.10	220,004	193,134	268,738	847,404
	12 mos.	881	39,550,228	4,015,056	45,718,029	5,478,772	12,768,951	493,552	17,800,470	1,881,689	38,675,371	84.60	7,042,658	6,052,312	6,886,630	1,890,005
Delaware, Lackawanna & Western	Dec.	994	4,752,932	1,127,465	6,619,954	1,052,776	1,492,268	106,380	2,847,083	168,375	5,713,166	86.30	906,788	—95,512	—73,349	2,650,716
	12 mos.	994	63,666,315	14,533,712	86,243,394	10,138,387	19,125,656	1,312,869	35,117,116	2,051,891	68,377,520	79.30	17,865,874	12,516,049	12,997,084	4,557,477
Denver & Rio Grand Western	Dec.	2,593	1,803,099	398,929	2,413,641	331,780	609,808	56,337	792,531	87,744	1,922,858	79.70	490,783	315,850	309,717	98,977
	12 mos.	2,591	24,254,946	6,022,383	32,659,759	6,422,430	7,894,511	514,891	11,198,660	1,029,724	27,659,286	84.70	5,000,473	3,151,748	3,534,496	6,348,452
Denver & Salt Lake	Dec.	255	116,119	19,797	148,192	22,837	30,166	1,078	38,180	6,123	98,384	66.40	49,808	40,736	46,225	3,520
	12 mos.	255	2,358,222	368,644	2,879,058	676,182	800,222	13,323	1,162,315	81,149	2,733,191	94.90	145,867	43,589	32,871	—751,517
Detroit & Mackinac	Dec.	385	77,448	34,659	125,471	4,098	34,718	2,159	64,073	5,727	110,738	88.30	14,733	3,732	2,601	—90,443
	12 mos.	380	1,442,809	406,135	1,972,441	293,648	536,631	27,993	831,050	78,021	1,766,132	89.50	206,309	68,217	65,571	—155,371
Detroit & Toledo Short Line	Dec.	61	226,659	.....	231,669	29,871	25,129	2,086	124,596	10,139	191,821	87.10	39,848	25,848	—78,388	60,102
	12 mos.	61	2,759,233	.....	2,807,447	336,461	398,748	29,269	855,579	85,745	1,705,802	60.80	1,101,645	915,573	328,706	24,719
Duluth & Iron Range	Dec.	294	59,864	18,696	96,507	103,707	115,354	1,276	98,814	17,617	337,075	349.30	—240,568	—224,025	—235,897	—1,368,476
	12 mos.	291	4,247,789	259,223	4,972,514	1,095,755	1,141,195	14,208	1,887,633	222,272	4,369,545	87.90	602,969	303,788	295,841	3,199,331
Duluth, Missabe & Northern	Dec.	405	73,756	43,409	135,510	79,584	145,659	3,122	204,664	19,939	454,294	335.20	—318,784	—433,069	—25,010	—3,366,478
	12 mos.	407	10,671,233	593,717	12,374,949	1,985,713	1,955,318	38,666	3,044,870	265,936	7,311,611	59.10	5,063,338	3,682,576	3,650,389	5,895,755
Duluth, South Shore & Atlantic	Dec.	591	175,302	91,410	292,377	34,381	71,892	6,201	190,959	11,273	321,368	109.90	—28,991	—67,390	—74,216	43,741
	12 mos.	591	2,852,590	1,161,075	4,464,860	866,807	970,810	80,129	2,420,043	147,829	4,565,200	102.20	—100,340	—457,870	—594,530	—243,434
Duluth, Winnipeg & Pacific	Dec.	178	149,502	21,444	175,165	73,528	35,560	5,365	76,982	6,344	197,752	112.80	—22,587	—31,352	—34,153	—28,928
	12 mos.	178	1,927,269	349,759	2,344,817	611,908	503,611	65,489	1,138,315	119,955	2,437,404	103.90	—92,587	—216,328	—243,563	7,903
Elgin, Joliet & Eastern	Dec.	839	1,441,804	.....	1,591,021	144,918	324,455	10,654	470,731	33,906	984,659	61.90	606,362	609,674	519,647	535,259
	12 mos.	836	17,575,835	113	19,334,942	2,305,822	4,303,274	144,382	6,412,124	449,761	13,613,039	70.40	5,721,903	4,753,338	3,334,951	3,526,681
El Paso & Southwestern	Dec.	1,027	549,417	172,114	787,030	150,080	140,778	29,274	220,957	45,445	524,817	66.70	262,213	16,342	144,969	570,206
	12 mos.	1,027	7,946,709	2,270,722	10,910,087	1,920,360	2,236,117	330,605	3,299,908	594,000	8,420,673	77.20	2,489,414	1,403,140	1,165,688	2,850,924
Erie	Dec.	1,989	5,382,092	1,096,784	7,020,062	1,245,478	3,063,912	103,136	3,628,797	307,047	8,388,252	119.49	—1,368,190	—1,409,365	—1,261,291	—1,890
	12 mos.	1,989	82,011,727	14,198,445	102,835,505	12,503,602	30,649,198	1,532,238	46,088,573	3,569,683	94,893,209	92.28	7,942,296	4,732,254	5,569,108	—14,133,326
Chicago & Erie	Dec.	269	524,438	55,878	657,415	80,755	136,804	16,264	636,243	42,928	911,611	137.92	—254,196	—314,839	—713,711	—128,406
	12 mos.	269	9,200,422	824,184	10,703,591	1,502,702	1,850,955	227,651	6,200,648	489,264	10,263,948	95.89	439,643	—131,667	—3,435,413	—2,860,793
New Jersey & New York	Dec.	47	18,159	98,264	120,655	8,543	29,313	735	85,760	2,339	126,689	105.00	—6,034	—6,770	—32,115	7,008
	12 mos.	47	231,658	1,212,732	1,487,954	190,345	237,431	17,752	840,790	33,524	1,319,836	88.70	168,118	135,173	—189,472	—242,294
N. Y., Susquehanna & Western	Dec.	135	176,151	61,088	277,692	101,586	60,768	2,393	228,621	9,880	403,243	145.20	—125,551	—114,607	—107,704	—235,083
	12 mos.	135	2,916,605	780,793	4,208,711	686,787	655,475	43,387	2,579,146	119,390	4,084,171	97.00	124,540	—149,407	—88,408	—1,178,439
Florida East Coast	Dec.	764	710,938	314,680	1,220,293	209,582	135,134	11,828	624,699	27,347	1,010,102	82.80	210,191	99,303	62,661	99,713
	12 mos.	764	7,809,744	4,010,241	13,558,013	2,988,273	2,534,978	156,865	5,194,967	336,524	11,303,427	83.30	2,254,586	1,449,628	981,723	1,826,169
Fort Smith & Western	Dec.	253	91,997	25,293	135,837	28,521	24,015	5,414	53,265	7,909	120,121	88.40	15,716	8,429	—276	—18,872
	12 mos.	253	1,311,021	310,460	1,773,094	424,373	397,737	61,526	710,368	89,515	1,702,584	96.00	70,510	2,427	—74,195	54,110
Ft. Worth & Rio Grande	Dec.	235	104,501	34,087	152,372	77,875	25,472	2,599	7,353	6,369	105,242	69.10	47,130	46,182	39,577	—211,727
	12 mos.	235	1,146,219	472,694	1,771,261	496,735	307,582	36,809	828,449	80,285	1,747,691	98.70	23,570	—17,576	—150,772	—1,191,969
Galveston Wharf	Dec.	13	.....	.....	136,622	248,374	8,878	755	82,598	6,969	372,575	272.20	—235,953	—243,453	—243,823	65,716
	12 mos.	13	.....	.....	2,608,285	881,301	59,880	9,334	593,408	52,117	1,912,309	73.30	695,976	495,759	493,821	260,922
Georgia	Dec.	328	245,759	109,132	373,252	64,841	95,236	23,662	217,924	18,001	418,210	112.00	—44,958	—63,748	—44,529	—44,219
	12 mos.	328	3,468,425	1,334,542	5,154,986	609,355	1,196,197	238,622	2,841,361	239,309	5,125,478	99.40	29,508	—58,531	—1,010	—257,814
Atlantic & St. Lawrence	Dec.	166	245,184	32,455	265,765	11,848	53,600	1,451	139,689	7,861	175,692	66.10	90,073	79,992	28,676	6,414
	12 mos.	166	2,115,860	507,976	2,787,169	780,773	503,016	38,315	1,614,914	201,452	3,148,324	113.00	—361,155	—564,817	—1,256,934	—1,648,142
Georgia & Florida	Dec.	405	89,170	18,688	115,686	17,158	22,815	8,974	85,995	7,288	142,440	123.10	—26,754	—18,714	—25,742	—62,602
	12 mos.	405	1,072,292	206,985	1,389,678	313,292	234,155	95,458	720,903	91,444	1,458,058	104.90	—68,380	—147,157	—237,605	—921,752
*Grand Trunk Western	Dec.	352	534,232	175,498	798,974	99,992	398,107	34,416	579,654	52,176	1,170,997	146.60	—372,023	—423,836	—573,096	—530,255
	12 mos.	352	11,283,114	2,316,139	14,320,467	2,147,589	3,361,875	395,061	6,958,038	697,900	13,639,937	95.20	680,530	—536,059	—2,319,151	—1,909,492

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
Great Northern	Dec.	8,161	$5,512,205	$1,178,207	$7,675,481	$866,891	$1,627,767	$133,011	$3,036,375	$182,800	$5,939,310	77.40	$1,736,171	$1,216,730	$1,255,936	$201,801
	12 mos.	8,163	74,700,241	16,460,280	101,317,204	13,865,917	21,075,308	1,601,478	40,494,719	2,752,129	80,496,913	79.50	20,820,291	12,480,988	12,866,411	3,017,647
Green Bay & Western	Dec.	252	85,542	17,636	109,876	20,808	28,744	2,320	35,498	4,333	34,198	31.10	75,678	60,887	58,279	15,360
	12 mos.	252	1,087,582	207,219	1,395,576	259,472	248,956	22,493	508,340	37,844	1,076,859	77.10	318,717	222,498	192,661	59,910
Gulf & Ship Island	Dec.	307	172,661	43,657	229,921	42,878	29,652	7,986	84,366	13,295	178,879	77.80	51,042	56,505	53,310	—3,640
	12 mos.	307	2,128,790	526,054	2,852,960	522,585	527,436	78,656	1,050,929	157,430	2,341,487	82.00	511,473	297,410	269,312	—350,155
Gulf, Mobile & Northern	Dec.	436	282,354	42,430	336,885	48,838	48,230	14,203	165,690	15,194	290,793	86.30	46,092	27,569	19,526	28,252
	12 mos.	453	3,407,105	489,327	4,086,217	703,030	789,877	156,823	1,829,722	178,524	3,653,017	89.30	433,200	198,736	98,873	—1,034,095
Hocking Valley	Dec.	350	710,798	98,581	870,753	102,203	127,498	10,414	335,010	31,848	606,932	69.70	263,821	323,454	364,103	131,647
	12 mos.	350	11,924,979	1,270,021	14,093,001	1,686,611	4,366,047	131,599	4,972,440	417,470	11,572,394	82.10	2,520,607	1,708,545	1,560,741	1,746,606
†Illinois Central	Dec.	4,799	8,243,078	2,089,320	11,086,427	1,006,266	909,280	161,501	4,357,924	276,904	2,889,179	26.10	8,197,248	7,603,752	7,793,100	—6,187,351
	12 mos.	4,799	107,092,090	24,740,351	141,127,066	19,692,494	30,481,580	1,887,702	53,492,387	3,679,123	109,886,408	77.90	31,240,658	22,836,372	24,248,679	—511,296
International & Great Northern	Dec.	1,159	847,216	221,681	1,192,146	229,560	223,267	27,707	564,515	48,653	1,098,567	92.13	93,578	50,138	—16,746	124,302
	12 mos.	1,159	13,178,384	2,961,982	17,639,783	2,924,392	3,546,090	316,218	8,768,432	622,321	16,254,947	92.15	1,384,835	920,087	—324,441	—1,749,257
Kansas City, Mexico & Orient	Dec.	272	95,163	11,268	113,776	26,235	25,095	4,677	80,978	15,026	152,011	133.60	—38,235	—46,778	—41,020	—5,458
	12 mos.	272	1,517,974	164,333	1,789,643	372,097	517,073	65,142	881,711	156,159	1,992,182	111.30	—202,539	—299,554	—257,679	—778,087
Kans. City, Mex. & Orient of Tex.	Dec.	465	137,077	14,732	165,009	24,720	29,352	5,120	100,632	6,694	166,518	100.90	—1,509	—5,456	—24,461	63,261
	12 mos.	465	1,884,257	215,074	2,199,355	468,469	594,821	64,431	1,251,316	81,538	2,460,575	111.90	—261,220	—332,842	—549,061	—692,019
Kansas City Southern	Dec.	779	1,123,089	166,857	1,419,918	257,675	374,170	39,046	497,077	90,729	1,255,073	88.40	164,845	67,937	62,719	315,920
	12 mos.	779	15,905,722	2,269,030	19,609,283	2,797,823	3,634,163	459,711	6,844,924	878,846	14,600,297	74.50	5,008,986	4,007,802	3,814,194	2,228,919
Texarkana & Ft. Smith	Dec.	93	122,645	15,783	150,795	6,469	17,298	5,038	88,654	8,666	126,330	74.30	24,465	47,282	23,921	45,036
	12 mos.	93	1,795,540	202,785	2,177,755	202,825	256,019	60,697	770,614	111,798	1,403,211	63.90	774,544	715,168	436,351	499,538
*Kansas City Terminal	Dec.	27	.....	.....	131,069	19,030	15,005	.....	26,301	3,748	67,023	51.10	64,046	58,013	284,293	206,780
	12 mos.	27	.....	.....	1,617,080	223,146	238,663	.....	616,555	44,844	1,153,187	71.30	463,893	149,522	2,794,037	2,136,675
Kansas, Oklahoma & Gulf	Dec.	314	186,397	16,179	210,705	28,643	24,520	5,045	90,390	10,512	157,489	74.70	53,216	43,257	25,367	1,294
	12 mos.	317	2,034,787	184,061	2,330,969	540,323	381,756	51,835	1,021,506	127,071	2,123,318	91.10	207,651	97,606	—16,806	—323,237
Lake Superior & Ishpeming	Dec.	33	1,947	96	7,259	11,887	9,549	204	9,068	5,637	36,345	500.70	—29,086	—34,445	—32,752	—231,280
	12 mos.	33	335,274	2,019	411,615	199,253	175,332	3,010	139,393	38,574	555,562	135.00	—143,947	—209,210	—202,407	501,928
Lake Terminal	Dec.	13	.....	.....	92,001	2,347	11,815	.....	36,209	36	50,407	54.80	41,954	10,427	21,567	6,689
	12 mos.	13	.....	.....	1,201,902	150,320	206,488	.....	629,742	1,444	987,994	82.20	213,908	114,581	173,929	—288,228
Lehigh & Hudson River	Dec.	96	243,250	3,737	255,917	37,177	96,051	1,893	102,474	9,014	246,609	96.40	9,308	—2,337	—31,219	47,320
	12 mos.	96	3,076,756	50,133	3,242,290	381,911	607,376	21,329	1,326,640	92,587	2,429,843	74.90	812,447	667,136	394,962	—37,006
Lehigh & New England	Dec.	237	358,600	2,006	368,712	63,383	104,197	11,580	129,218	15,718	323,976	87.90	44,736	22,666	37,488	126,991
	12 mos.	237	4,666,996	25,241	4,866,692	734,885	1,169,866	80,160	1,617,195	193,984	3,795,741	78.00	1,070,951	844,514	967,714	903,699
Lehigh Valley	Dec.	1,448	4,396,195	542,917	5,317,267	330,926	1,424,132	105,042	2,361,434	154,163	4,398,697	82.70	918,570	769,628	833,169	164,595
	12 mos.	1,448	62,322,829	7,700,483	74,929,913	7,785,611	25,138,717	1,225,932	31,396,218	1,703,357	67,530,014	90.10	7,399,899	5,434,671	5,582,216	—6,779,615
Louisiana & Arkansas	Dec.	302	197,127	38,614	246,212	50,263	62,301	6,746	90,397	8,051	216,864	88.10	29,348	1,343	4,475	40,963
	12 mos.	302	2,870,848	410,975	3,380,764	640,584	774,343	77,933	1,140,715	101,635	2,728,910	80.70	651,854	422,187	349,159	624,751
Louisiana Ry. & Nav. Co.	Dec.	343	194,983	37,770	248,555	89,792	64,242	11,529	202,125	.....	382,290	153.80	—133,735	—157,480	—179,436	—136,896
	12 mos.	343	3,246,888	416,043	3,863,970	815,550	540,171	124,908	1,600,760	151,978	3,229,421	83.50	634,549	433,717	128,205	—220,340
Louisville, Henderson & St. Louis.	Dec.	199	150,399	60,096	221,586	64,720	2,656	7,712	96,635	8,203	179,926	81.20	41,660	32,166	22,231	—111,518
	12 mos.	199	1,887,159	756,484	2,863,043	563,310	492,665	80,503	1,072,368	103,414	2,312,260	80.80	550,783	454,802	292,592	125,087
Louisville & Nashville	Dec.	5,038	6,039,926	1,869,380	8,405,120	1,495,132	2,321,860	225,414	4,109,940	235,724	8,432,288	100.30	—27,168	—403,744	—326,388	560,872
	12 mos.	5,041	86,815,588	23,193,389	117,149,124	18,668,760	33,270,928	2,485,080	51,252,762	2,979,471	108,957,124	93.00	8,192,000	4,616,531	3,874,426	3,283,698
Los Angeles & Salt Lake	Dec.	1,168	849,119	387,212	1,418,384	239,120	346,057	58,529	559,177	40,552	1,282,564	90.40	135,820	95,716	39,130	371,556
	12 mos.	1,168	12,245,510	5,529,697	19,524,305	4,011,898	4,103,443	586,242	6,716,904	418,897	16,410,646	84.10	3,113,659	1,986,171	1,459,961	3,542,610
Maine Central	Dec.	1,215	1,034,984	365,696	1,517,535	378,967	352,799	10,541	752,573	35,912	1,532,053	100.90	—14,518	—120,859	—154,212	—364,406
	12 mos.	1,215	14,275,951	4,909,998	20,590,064	3,926,105	4,704,186	158,741	10,153,522	555,820	19,533,352	94.80	1,056,712	—210,179	—466,962	—2,573,706
Midland Valley	Dec.	388	258,083	75,076	346,217	54,400	49,037	4,278	114,458	14,752	236,925	68.40	109,292	158,462	152,456	62,675
	12 mos.	388	3,326,272	924,588	4,462,758	919,207	711,053	56,846	1,510,618	214,168	3,406,801	76.30	1,055,957	979,624	929,723	730,232
Minneapolis & St. Louis	Dec.	1,650	912,208	183,246	1,171,238	123,349	206,625	23,446	534,918	41,577	929,837	79.40	241,401	200,592	169,772	59,206
	12 mos.	1,650	13,131,342	2,231,059	16,171,727	2,505,125	3,714,200	298,222	7,831,501	524,558	14,873,834	92.00	1,297,893	485,299	137,009	—1,350,721
Minneapolis, St. P. & S. S. Marie.	Dec.	4,375	2,285,101	563,278	3,108,623	817,972	482,841	48,591	1,461,650	101,691	2,928,699	94.20	179,924	46,370	—12,118	—663,026
	12 mos.	4,297	31,255,227	8,082,848	42,938,421	7,607,418	9,887,457	635,576	19,741,177	1,317,892	39,443,594	91.90	3,494,827	659,667	—189,983	593,824
Mississippi Central	Dec.	259	90,707	21,105	117,469	43,813	13,340	5,581	48,550	6,681	117,318	99.80	151	—3,480	—7,733	—42,775
	12 mos.	221	917,952	231,488	1,198,143	287,224	346,653	41,820	444,238	82,187	1,200,775	100.20	—2,632	—77,841	—125,708	—397,981
Missouri, Kansas & Texas	Dec.	1,714	1,513,492	523,122	2,548,741	378,943	654,783	43,447	1,110,921	92,302	2,284,242	89.60	264,499	181,521	399,859	717,382
	12 mos.	1,715	23,580,150	6,910,286	33,488,591	4,858,485	8,805,202	546,549	11,383,238	1,139,734	26,764,368	79.90	6,724,223	4,891,212	6,256,808	5,582,923
Wichita Falls & Northwestern	Dec.	328	108,605	28,233	157,864	33,360	27,636	800	69,432	5,984	137,230	86.90	20,634	24,123	80	—443
	12 mos.	328	2,221,458	377,580	2,734,870	455,791	365,960	10,958	904,418	83,802	1,820,705	66.60	914,165	746,371	482,167	—628,625
Mo., Kansas & Texas of Texas	Dec.	1,739	1,040,916	514,309	1,792,834	590,050	375,184	44,436	978,089	76,348	2,075,882	115.80	—283,048	—307,655	—524,112	—163,013
	12 mos.	1,739	17,981,084	6,616,814	26,797,515	4,521,363	4,632,266	507,038	10,579,149	1,070,593	21,470,711	80.10	5,326,804	4,702,844	2,041,953	—6,102,133
	Dec.	56	87,223	958	89,401	29,574	27,713	957	24,169	6,309	88,722	99.20	679	—2,623	19,089	29,249
	12 mos.	56	1,375,561	11,324	1,408,939	347,354	572,939	13,070	385,649	83,076	1,402,142	99.50	6,797	—32,485	205,445	380,452
Missouri & North Arkansas	Dec.	364	—480	—78	—500	1,851	3,943	168	1,819	3,242	11,023	.....	—11,523	—11,556	—7,460	8,703
	12 mos.	364	411,730	191,277	661,973	249,122	281,157	24,686	458,111	61,466	1,074,520	162.30	—412,547	—461,779	—536,737	—282,855
Missouri Pacific	Dec.	7,300	5,242,221	1,488,009	7,725,256	1,536,125	1,416,343	148,516	3,767,088	282,895	7,185,197	93.00	540,059	136,361	—88,194	1,141,974
	12 mos.	7,300	81,660,401	19,240,495	109,745,072	18,130,665	22,938,189	1,924,433	45,317,690	3,385,981	92,042,456	83.90	17,702,616	13,364,877	9,884,376	—4,557,511
Mobile & Ohio	Dec.	1,165	1,211,445	155,191	1,505,323	176,334	401,675	34,219	584,296	53,313	1,260,903	83.80	244,420	187,633	178,530	—174,234
	12 mos.	1,165	15,345,283	1,866,840	18,190,178	2,487,322	4,906,173	540,060	7,548,453	628,923	16,124,528	88.60	2,065,650	1,325,983	1,174,974	—1,101,062

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
Monongahela	Dec.	106	$347,449	$35,618	$387,323	$50,999	$59,854	$1,118	$117,512	$7,211	$236,694	61.11	$150,629	$133,129	$74,776	$130,034
	12 mos.	106	3,914,240	423,924	4,394,105	813,867	807,282	20,527	1,270,831	96,013	3,008,520	68.47	1,385,585	1,285,579	684,734	—186,466
Monongahela Connecting	Dec.	7	.....	.....	96,876	20,098	26,749	506	42,272	141	89,484	92.40	7,392	5,936	—2,151	40,184
	12 mos.	7	.....	.....	824,143	133,934	191,457	6,338	411,235	64,470	807,434	98.00	16,709	—4,477	—77,844	399,216
Montour	Dec.	56	87,223	958	89,401	29,574	27,713	957	24,169	6,309	88,722	99.20	679	—2,623	19,089	29,249
	12 mos.	56	1,375,561	11,324	1,408,939	347,354	572,939	13,070	385,649	83,076	1,402,142	99.50	6,797	—32,485	205,445	380,452
Nashville, Chattanooga & St. Louis	Dec.	1,258	1,037,704	408,372	1,542,897	271,193	527,077	66,741	842,201	66,135	1,777,933	115.20	—235,036	—275,252	—276,856	14,671
	12 mos.	1,258	14,323,243	5,115,363	20,924,603	3,065,615	5,501,898	833,829	9,465,006	679,788	19,607,277	93.70	1,317,326	758,639	1,071,618	—15,677
Nevada Northern	Dec.	164	15,681	2,715	21,120	9,089	3,844	452	6,034	3,101	22,520	106.60	—1,400	—7,563	—4,870	10,282
	12 mos.	165	248,836	53,798	345,064	130,130	64,747	6,843	129,368	40,008	371,351	107.60	—26,287	—123,323	—96,440	367,759
Newburg & South Shore	Dec.	7	.....	.....	164,041	9,167	26,725	.....	48,064	3,750	87,706	53.50	76,335	51,969	45,360	17,983
	12 mos.	7	.....	.....	1,496,821	153,044	314,581	.....	636,075	49,723	1,153,423	77.10	343,398	198,331	213,458	—212,290
New Orleans Great Northern	Dec.	274	146,236	38,221	190,996	38,498	94,559	5,500	76,171	11,933	227,334	119.00	—36,338	—44,884	—53,233	—185,323
	12 mos.	274	1,916,880	517,421	2,546,145	428,100	648,567	64,816	1,041,270	121,748	2,310,040	90.70	236,105	44,771	—68,449	—256,178
New York Central	Dec.	6,078	15,640,229	7,237,612	26,340,887	3,446,762	5,488,922	356,599	10,641,432	829,243	13,934,986	52.90	12,405,901	11,724,280	11,586,247	2,030
	12 mos.	6,077	195,454,647	91,316,648	322,538,217	32,923,726	69,846,099	3,828,609	127,843,330	9,538,245	248,180,994	76.90	74,357,223	54,858,007	56,679,197	3,743,189
Cincinnati Northern	Dec.	244	185,769	17,893	213,057	93,025	82,726	4,530	81,653	7,218	83,083	39.00	129,974	42,589	30,637	—40,682
	12 mos.	244	3,421,874	220,904	3,757,713	471,565	738,142	56,498	1,287,935	88,807	2,642,291	70.30	1,115,422	840,448	702,255	315,389
Clev., Cin., Chic. & St. Louis	Dec.	2,415	4,117,000	382,530	6,030,609	930,833	777,059	113,889	2,476,914	156,662	2,640,572	43.80	3,390,037	3,084,830	2,943,449	482,480
	12 mos.	2,414	56,289,898	17,281,273	79,793,593	9,355,271	18,130,868	1,276,151	33,005,070	1,994,018	64,406,122	80.70	15,387,471	11,398,706	10,100,292	8,424,023
Indiana Harbor Belt	Dec.	119	.....	.....	683,384	324,905	1,209,544	2,756	325,247	16,398	—340,238	80.70	1,223,622	1,197,220	1,125,775	—196,561
	12 mos.	120	.....	.....	9,034,538	1,440,866	333,546	43,324	3,886,355	276,821	5,981,052	.....	3,053,486	2,782,187	1,578,852	—2,897,419
Kanawha & Michigan	Dec.	176	211,259	55,664	283,341	16,730	189,460	4,250	103,762	9,861	290,577	102.60	—7,236	39,712	77,304	47,850
	12 mos.	176	3,907,684	702,735	4,785,161	778,325	1,750,678	47,028	1,642,760	130,908	4,349,627	90.90	435,534	115,143	529,013	692,189
Lake Erie & Western	Dec.	718	582,981	42,523	662,712	449,746	433,679	18,267	296,841	30,436	361,474	54.50	301,238	250,636	222,733	56,052
	12 mos.	718	7,983,480	639,665	9,061,493	1,875,953	1,816,448	223,299	3,891,067	331,778	8,137,732	89.80	923,761	327,674	197,251	—67,150
Michigan Central	Dec.	1,862	3,561,641	1,590,894	5,857,005	352,487	1,696,127	109,721	3,146,502	151,027	1,424,705	24.30	4,432,300	2,650,633	2,535,798	5,493
	12 mos.	1,862	45,728,135	20,016,387	72,911,852	7,506,009	11,696,773	1,125,581	29,533,984	1,778,962	52,551,944	72.10	20,359,908	15,625,778	15,403,271	4,395,633
Pittsburgh & Lake Erie	Dec.	227	1,614,886	219,165	1,908,146	716,975	642,495	17,726	827,340	62,833	842,503	44.20	1,065,643	2,278,092	2,319,404	—214,308
	12 mos.	227	18,746,699	2,974,304	23,226,059	2,826,414	7,311,235	241,597	9,103,749	830,905	20,340,436	87.60	2,885,623	1,682,355	4,066,871	1,703,591
Toledo & Ohio Central	Dec.	503	607,698	70,881	710,145	100,207	126,775	12,507	314,184	26,534	125,194	17.63	584,951	528,303	528,671	214,530
	12 mos.	503	9,380,699	900,602	10,711,986	1,534,197	2,189,236	128,999	4,209,321	334,553	8,425,297	78.65	2,286,689	1,591,223	1,858,993	1,396,488
New York, Chicago & St. Louis	Dec.	574	2,098,105	98,819	2,245,052	294,175	403,995	51,783	832,022	80,597	1,665,404	74.20	579,648	350,579	315,334	184,146
	12 mos.	574	25,026,098	1,418,823	27,030,664	3,040,187	5,227,418	676,666	10,649,396	969,312	20,613,593	76.30	6,417,071	4,592,717	4,428,098	3,627,868
N. Y., New Haven & Hartford	Dec.	1,986	4,657,061	4,082,919	9,899,414	1,212,476	2,276,095	69,656	4,364,928	326,604	8,414,895	85.00	1,484,519	1,309,129	748,532	—1,291,791
	12 mos.	1,986	53,593,929	50,934,293	116,405,233	17,355,931	27,424,577	728,599	54,728,204	4,061,645	106,402,295	91.40	10,002,938	5,513,942	740,034	—12,575,137
Central New England	Dec.	295	576,241	21,110	629,216	90,863	101,956	3,800	220,915	11,927	429,717	68.30	199,499	127,888	78,447	166,354
	12 mos.	300	7,770,888	287,905	8,382,790	1,582,145	1,218,545	46,910	3,009,321	164,925	6,022,487	71.80	2,360,303	2,062,215	1,297,332	—1,992,560
New York, Ontario & Western	Dec.	569	705,426	135,531	992,837	168,356	182,279	17,551	500,549	30,946	899,681	90.60	93,156	33,673	21,021	42,383
	12 mos.	569	8,775,320	3,421,743	14,127,867	2,291,227	3,194,650	179,236	6,025,267	376,706	12,067,086	85.40	2,060,781	1,603,350	1,297,074	—106,891
Norfolk & Western	Dec.	2,232	6,003,827	809,954	7,218,894	1,029,553	1,622,359	60,968	2,105,126	159,921	5,000,720	69.30	2,218,174	1,792,976	2,138,886	890,211
	12 mos.	2,225	67,294,973	10,077,887	80,760,590	11,778,984	19,342,536	843,043	30,018,158	1,836,986	64,006,171	79.30	16,754,419	11,993,834	14,870,021	3,655,717
Norfolk Southern	Dec.	942	507,903	142,185	680,846	69,267	80,230	20,385	297,909	31,356	499,536	73.40	181,310	170,632	147,499	—88,636
	12 mos.	942	5,946,351	1,632,956	8,056,795	1,228,318	1,213,132	265,325	3,653,783	386,599	6,752,509	83.80	1,304,286	937,852	772,275	—862,939
Northern Pacific	Dec.	6,658	5,745,733	1,180,580	7,500,813	626,482	2,043,323	171,462	1,854,885	236,053	5,064,568	67.50	2,436,245	1,634,776	2,005,527	948,887
	12 mos.	6,657	69,246,505	17,015,154	94,538,059	14,312,917	21,825,817	1,537,545	35,797,967	2,868,490	77,630,867	82.10	16,907,192	7,875,176	10,843,826	7,949,459
Northwestern Pacific	Dec.	507	295,287	193,085	569,462	126,866	121,010	6,174	254,957	15,542	526,476	92.50	42,986	—13,421	—28,785	—88,280
	12 mos.	520	4,724,876	2,856,387	8,609,732	1,524,613	1,214,774	73,864	3,331,109	193,523	6,365,464	73.90	2,244,268	1,760,435	1,608,331	985,515
Balt., Chesapeake & Atlantic	Dec.	87	64,331	31,024	101,513	8,427	15,081	1,034	92,815	4,422	121,779	120.00	—20,266	—20,630	—20,711	6,582
	12 mos.	87	1,070,091	488,092	1,606,419	147,381	332,407	19,455	958,022	47,276	1,504,541	93.70	101,878	55,898	69,344	—164,587
Grand Rapids & Indiana	Dec.	575	125,397	153,386	366,730	36,612	342,908	10,156	351,533	41,008	782,603	213.40	—415,873	—458,063	513,567	—118,774
	12 mos.	575	5,503,887	2,320,922	8,504,188	998,179	2,292,436	169,228	4,778,919	320,586	8,582,421	100.90	—78,233	—529,531	—787,762	—598,280
Long Island	Dec.	398	641,085	1,213,241	2,009,384	240,036	403,574	16,916	1,208,150	54,753	1,938,557	96.50	70,827	—80,197	—142,101	—605,324
	12 mos.	398	8,273,615	18,086,144	28,720,911	3,320,693	4,993,378	221,478	13,696,486	737,996	23,181,985	80.70	5,538,926	3,969,289	3,311,214	—1,473,541
Maryland, Delaware & Virginia	Dec.	82	64,139	21,570	89,386	6,257	13,371	721	88,574	2,864	111,787	125.10	—22,401	—21,714	—24,784	—55,026
	12 mos.	82	814,304	397,560	1,251,171	126,317	244,480	15,873	867,759	30,470	1,284,899	102.70	—33,728	—58,244	—102,439	—329,673
Pittsburgh, Cin., Chic. & St. L.	Dec.	2,412	4,281,083	1,189,860	7,069,350	1,298,174	3,160,800	117,633	3,714,917	229,326	8,582,397	121.40	—1,513,047	—2,054,348	—2,375,913	1,809,965
	12 mos.	2,412	64,065,083	22,076,799	96,717,043	13,314,128	28,798,390	1,443,830	44,173,124	2,756,143	91,304,583	94.40	5,412,460	289,548	—2,748,924	—9,877,625
Peoria & Pekin Union	Dec.	19	16,697	2,680	148,601	6,093	19,078	233	60,219	7,818	93,441	62.90	55,160	43,456	81,039	—8,457
	12 mos.	19	170,965	24,976	1,696,110	229,062	393,643	1,394	841,725	86,070	1,551,894	91.50	144,216	—28,690	253,899	—283,882
Pennsylvania	Dec.	7,323	24,274,448	10,468,630	39,492,919	5,595,113	12,187,939	401,897	14,861,218	1,142,308	34,779,362	88.10	4,703,057	3,141,924	3,108,067	—150,891
	12 mos.	7,323	328,932,914	129,324,480	500,175,084	61,093,427	132,091,758	5,312,286	210,350,455	13,636,341	430,758,629	86.10	69,416,455	48,485,067	—1,104,031	—54,057,751

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Maintenance of: Way and structures.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
Cumberland Valley & Martinsburg	Dec.	33	$155,057	$6,203	$164,332	$8,474	$23,216	$689	$30,346	$2,325	$65,050	39.60	$99,282	$86,201	$79,019	$116,910
	12 mos.	33	1,322,357	76,197	1,421,228	135,287	255,001	8,515	434,288	25,914	859,005	60.40	562,223	494,383	422,374	—1,432
Cin., Lebanon & Northern	Dec.	76	33,862	8,886	68,787	60,576	18,901	1,813	62,798	3,876	147,967	215.10	—79,180	—85,987	—90,061	91,174
	12 mos.	76	953,662	95,118	1,196,170	249,426	309,059	21,228	772,126	36,086	1,387,916	116.00	—191,746	—294,199	—291,950	—168,260
N. Y., Phil. & Norfolk	Dec.	122	212,376	111,574	374,861	70,357	159,925	7,413	365,412	14,965	633,675	169.00	—258,814	—250,386	—276,353	—275,775
	12 mos.	122	4,433,076	1,171,781	6,151,502	608,888	1,840,320	95,256	4,032,292	172,181	6,901,482	112.20	—749,980	—968,007	—1,171,892	—982,304
West Jersey & Seashore	Dec.	359	205,080	401,154	723,732	156,203	200,899	14,319	502,534	26,547	910,684	125.80	—186,952	—193,006	—227,237	—177,938
	12 mos.	359	3,813,298	8,179,098	12,929,706	1,997,624	2,486,110	168,346	6,601,461	313,346	11,683,648	90.40	1,246,058	534,286	287,143	—1,099,633
Pere Marquette	Dec.	2,222	1,967,332	432,711	2,644,110	289,793	646,974	59,284	1,212,680	104,974	2,310,233	87.40	333,877	235,356	85,436	95,340
	12 mos.	2,231	29,291,665	5,940,618	38,161,240	4,579,270	8,161,996	588,288	15,593,831	1,274,975	30,279,574	79.30	7,881,666	6,279,369	5,106,442	260,530
Philadelphia & Reading	Dec.	1,127	5,639,778	838,407	6,825,184	819,752	314,581	59,053	3,851,262	159,212	4,569,316	66.90	2,255,868	2,612,745	2,395,129	412,781
	12 mos.	1,126	71,176,368	10,233,086	84,924,227	9,770,589	20,815,779	704,781	35,118,615	1,886,357	68,361,308	80.50	16,562,919	14,820,302	12,805,667	—655,107
Atlantic City	Dec.	177	104,604	125,232	236,747	73,581	45,290	3,099	134,989	7,804	261,839	111.90	—28,092	—47,734	—67,575	—171,660
	12 mos.	177	1,375,080	3,132,212	4,615,848	767,252	613,327	45,505	2,473,930	44,894	3,945,849	85.50	669,999	441,176	64,397	—42,504
Perkiomen	Dec.	41	98,744	6,888	109,385	5,749	4,037	221	44,250	930	55,211	50.50	54,174	69,101	63,754	56,394
	12 mos.	41	1,123,183	114,818	1,285,803	117,874	48,750	1,055	489,418	8,480	665,851	51.80	619,952	550,540	483,795	482,172
Port Reading	Dec.	21	123,671	.....	162,956	27,027	381	229	56,765	4,497	88,137	54.10	74,819	74,379	23,810	55,401
	12 mos.	21	1,623,883	.....	2,236,444	276,315	91,792	1,694	815,272	22,990	1,208,059	54.00	1,028,385	875,106	146,391	—340,633
Pittsburgh & West Virginia	Dec.	85	164,725	11,103	207,256	15,095	199,664	3,125	63,896	19,880	314,953	151.96	—107,697	—144,849	—110,817	14,441
	12 mos.	85	2,268,832	142,329	2,798,255	672,056	1,655,350	37,532	880,583	286,988	3,665,645	131.00	—867,390	—1,193,558	—827,197	189,689
Quincy, Omaha & Kansas City	Dec.	252	56,443	23,580	96,389	45,755	31,296	1,010	48,321	7,358	133,560	138.60	—37,171	—35,548	—40,953	—72,953
	12 mos.	252	884,699	309,895	1,306,820	433,418	223,277	11,661	707,124	34,014	1,408,348	107.80	—101,528	—141,511	—195,673	—472,725
Richmond, Fredericksburg & Potomac	Dec.	117	356,102	273,829	871,662	161,880	137,820	8,039	338,733	25,925	683,923	78.50	187,739	172,817	131,460	—34,569
	12 mos.	117	5,069,361	3,577,332	10,002,075	1,505,957	1,686,962	95,818	4,057,652	339,798	7,859,004	78.60	2,143,071	1,740,930	1,275,457	1,766,089
Rutland	Dec.	413	242,156	117,567	437,797	207,463	95,245	8,482	214,993	17,056	354,304	80.90	83,493	47,994	58,270	14,300
	12 mos.	413	3,232,699	1,554,941	5,811,556	1,279,452	988,502	104,153	2,639,343	170,636	5,203,707	89.50	607,849	308,914	450,911	—235,117
St. Louis-San Francisco	Dec.	4,760	3,961,379	1,647,574	6,157,005	931,241	1,641,275	67,441	2,218,830	182,886	5,022,638	81.60	1,134,367	950,759	1,132,050	—911,686
	12 mos.	4,760	55,811,086	20,582,331	81,851,289	9,991,940	15,639,966	986,119	31,341,598	2,484,864	60,176,585	73.50	21,674,704	18,078,976	17,858,444	7,481,125
St. Louis, San Francisco & Texas	Dec.	134	148,029	10,004	165,717	51,906	15,193	2,365	16,098	4,309	89,865	54.20	75,852	75,178	40,681	—126,865
	12 mos.	134	1,672,009	198,122	1,937,998	491,505	333,316	39,730	860,403	79,540	1,804,302	93.10	133,696	111,136	—244,222	—941,950
St. Louis Southwestern	Dec.	968	1,298,515	162,275	1,518,498	131,029	172,963	45,216	386,190	56,399	798,198	52.60	720,300	633,607	604,340	616,850
	12 mos.	968	14,828,118	1,822,855	17,366,132	2,019,899	2,526,124	552,289	4,774,026	684,187	10,627,671	61.20	6,738,461	5,905,623	5,566,684	7,024,349
St. Louis Southwestern & Texas	Dec.	807	553,338	104,559	694,062	160,017	109,897	22,730	354,484	27,956	674,781	97.20	19,281	—5,581	—2,081	—104,907
	12 mos.	807	5,999,484	1,265,345	7,774,033	1,933,602	1,889,101	248,155	3,980,267	407,053	8,461,888	108.80	—687,855	—977,782	—807,925	—1,977,382
San Antonio & Aransas Pass	Dec.	739	351,866	73,082	480,723	152,318	131,326	7,043	211,341	23,167	524,843	109.20	—44,119	—63,746	—67,110	—52,511
	12 mos.	739	4,881,845	1,044,772	6,322,114	1,359,708	1,340,479	118,569	2,928,439	286,196	6,026,768	95.30	295,346	124,435	116,674	—181,944
San Antonio, Uvalde & Gulf	Dec.	317	33,404	18,074	60,879	14,742	886	3,141	33,618	6,181	58,568	96.20	2,311	—2,737	—14,675	—67,758
	12 mos.	317	737,749	281,348	1,149,443	192,035	186,287	36,805	441,836	77,119	934,082	81.30	215,361	178,951	47,970	—472,434
*Seaboard Air Line	Dec.	3,563	2,481,278	942,617	3,731,504	549,441	499,188	139,942	1,625,698	135,834	2,980,827	79.90	750,677	523,525	324,314	737,010
	12 mos.	3,563	29,235,714	9,754,523	42,875,257	5,005,066	7,844,156	1,460,471	20,543,830	1,775,956	37,009,848	86.30	5,865,409	3,970,188	2,109,931	—2,645,853
Southern	Dec.	6,971	6,401,399	2,667,644	10,504,258	1,326,276	1,598,691	200,459	4,062,787	359,707	7,620,178	72.50	2,884,080	2,406,992	1,805,948	723,089
	12 mos.	6,971	85,185,083	32,104,922	128,715,150	19,287,486	23,396,099	2,556,858	55,443,874	4,096,998	105,829,007	82.20	22,886,143	18,218,807	13,971,782	15,325,802
Alabama Great Southern	Dec.	313	588,926	166,913	828,932	45,248	139,435	22,982	322,129	30,249	475,077	57.30	353,855	319,221	303,392	209,029
	12 mos.	313	6,910,461	2,035,374	9,542,224	1,177,062	1,933,306	272,161	4,426,152	308,048	8,196,318	85.90	1,345,906	1,017,483	1,020,786	2,178,657
Cin., New Orleans & Tex. Pacific	Dec.	338	938,287	287,232	1,366,412	135,175	381,110	31,302	486,557	44,318	1,088,514	79.70	277,898	204,789	232,491	204,593
	12 mos.	338	12,586,859	3,516,637	17,170,444	2,326,988	4,359,476	364,131	7,107,572	504,124	14,789,236	86.10	2,381,208	1,729,575	1,942,444	4,097,282
Georgia Southern & Florida	Dec.	402	282,055	110,975	464,145	75,635	66,552	8,816	189,448	12,455	355,904	76.70	108,241	88,890	67,157	31,847
	12 mos.	402	3,093,686	1,030,193	4,586,771	959,670	924,180	115,794	2,509,599	157,373	4,669,211	101.80	—82,440	—290,366	—552,561	—235,845
New Orleans & Northeastern	Dec.	207	349,857	83,858	497,999	40,942	101,851	11,382	225,456	20,728	405,853	81.50	92,146	41,888	40,989	—73,882
	12 mos.	207	4,677,467	1,058,115	6,329,587	1,013,152	1,268,433	150,202	3,153,312	216,490	5,854,466	92.50	475,121	—107,898	—259,590	603,467
Northern Alabama	Dec.	110	81,159	12,544	98,557	12,566	8,877	2,599	44,749	3,620	29,525	30.00	69,032	65,545	44,664	3,503
	12 mos.	110	722,412	152,745	908,335	149,182	35,741	24,336	448,773	42,556	700,588	77.10	207,747	164,126	1,262	—79,386
Southern Pacific	Dec.	7,110	8,122,658	3,548,660	13,247,384	2,269,836	2,734,903	232,728	6,307,424	462,377	12,255,748	92.50	991,636	168,826	255,177	3,120,595
	12 mos.	7,110	122,269,171	48,134,466	189,996,741	27,292,587	31,868,461	2,581,696	70,662,072	5,487,337	141,288,801	74.40	48,707,940	35,975,085	33,726,877	26,563,599
*Arizona Eastern	Dec.	382	89,670	27,619	138,653	34,375	23,202	3,644	28,146	19,730	109,440	78.90	29,213	1,929	—6,632	2,932
	12 mos.	382	2,005,014	414,436	2,647,503	501,834	463,131	43,832	973,161	252,810	2,266,824	85.60	380,679	103,311	—11,785	354,408
*Atlantic Steamship Lines	Dec.	...	791,771	57,058	886,524	13,076	164,732	16,752	1,016,588	49,520	1,260,668	142.20	—374,144	—387,566	—387,426	—157,217
	12 mos.	...	9,398,184	705,771	10,656,078	175,126	2,566,414	205,052	7,138,090	357,859	10,442,541	98.00	213,537	69,238	—40,315	—4,982,888
Galv't'n., Harrisb'g & S. Antonio	Dec.	1,380	1,427,462	379,639	1,940,451	311,639	829,678	53,752	916,675	59,365	2,178,592	112.30	—238,141	—417,068	—548,089	1,063,460
	12 mos.	1,380	18,176,542	5,246,816	25,063,536	4,776,654	5,617,675	544,164	9,878,415	946,501	21,897,286	87.40	3,166,250	2,516,414	1,484,844	404,908
Houston & Texas Central	Dec.	932	1,323,026	362,340	1,776,082	48,774	648,143	27,164	783,945	47,921	1,554,649	87.50	221,433	84,031	—19,945	—102,686
	12 mos.	932	10,801,304	3,238,378	14,843,658	3,268,649	2,662,589	262,081	5,620,615	434,169	12,226,717	82.40	3,616,941	2,085,273	1,432,705	—645,548

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER AND TWELVE MONTHS OF CALENDAR YEAR 1921—CONTINUED

Name of road.		Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway Operations.	Operating income (or loss).	Net after rentals.	Net after rentals 1920.
			Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
Houston, East & West Texas	Dec.	191	$188,084	$46,856	$249,475	$78,591	$169,298	$3,999	$175,875	$10,203	$274,000	109.90	—$24,615	—$54,293	—$81,941	—$150,151
	12 mos.	191	2,273,772	568,337	2,994,772	613,665	530,890	42,085	1,292,713	95,804	2,561,721	85.50	433,051	343,971	148,707	—595,493
*Louisiana Western	Dec.	207	213,860	93,632	332,370	110,331	245,704	14,916	27,827	18,729	422,302	127.10	—89,932	—98,480	—114,015	—2,110
	12 mos.	207	2,993,533	1,129,911	4,387,857	725,352	1,072,643	136,251	1,304,846	203,898	3,496,254	79.70	891,603	583,985	525,564	661,697
*Morgan's L. & T. R.R. & S.S.Co.	Dec.	400	459,701	167,855	685,813	458,429	95,879	24,624	225,538	34,050	843,385	123.00	—157,572	—193,007	—289,925	—246,987
	12 mos.	400	6,232,200	1,961,760	8,789,650	2,332,962	1,888,511	212,610	3,688,456	377,736	8,561,561	97.40	228,089	—271,171	—653,356	202,852
Texas & New Orleans	Dec.	507	670,309	160,073	878,254	370,447	188,852	19,450	451,966	33,465	1,070,132	121.80	—191,878	—260,946	—332,766	—576,569
	12 mos.	479	6,462,066	1,846,943	8,804,746	2,081,383	2,373,530	142,834	3,745,881	321,215	8,725,563	99.10	79,183	—199,755	—630,626	—1,829,722
Spokane & International	Dec.	165	78,380	13,381	96,212	23,942	13,674	2,980	37,504	6,265	85,265	88.60	10,947	1,801	—7,185	45,641
	12 mos.	165	1,057,714	184,755	1,300,060	288,579	113,841	36,856	441,197	72,686	961,945	74.00	338,115	245,728	165,747	406,990
Spokane, Portland & Seattle	Dec.	549	457,330	143,497	663,319	42,960	94,135	10,047	220,675	20,407	396,760	59.80	266,559	226,508	222,106	465,030
	12 mos.	549	5,426,615	1,831,501	7,959,290	896,899	1,071,655	108,221	2,681,128	259,668	5,121,172	64.30	2,838,118	1,815,642	1,667,889	1,428,245
Tennessee Central	Dec.	292	106,036	46,739	168,578	42,239	43,547	4,939	98,384	10,016	199,125	118.10	—30,547	—31,812	—45,642	—51,879
	12 mos.	292	1,585,770	605,339	2,338,815	541,082	503,699	58,722	1,239,548	131,524	2,474,430	105.80	—135,615	—179,533	—399,594	—511,251
Term. R. R. Assn. of St. Louis	Dec.	37	.....	.....	370,148	60,601	35,966	1,042	136,674	9,371	248,075	67.00	122,073	75,285	189,685	—64,031
	12 mos.	37	.....	—8	4,527,866	1,028,144	431,852	11,897	1,612,981	104,125	3,233,426	71.40	1,294,440	588,330	1,992,743	1,388,874
East St. Louis Connecting	Dec.	3	.....	.....	116,734	13,020	6,406	367	59,397	3,176	82,366	70.60	34,368	1,714	—5,304	—33,244
	12 mos.	3	.....	.....	1,598,645	219,770	76,116	4,188	749,411	40,718	1,090,203	68.20	508,442	444,569	317,755	—412,737
St. Louis Mchts. Bridge Term.	Dec.	9	.....	.....	291,988	41,062	22,232	1,032	148,817	6,361	219,504	75.20	72,484	24,231	44,873	—43,691
	12 mos.	9	.....	.....	3,658,660	565,707	285,465	11,799	1,947,747	80,481	2,891,199	79.00	767,461	531,975	729,336	—494,968
St. Louis Transfer	Dec.	6	.....	.....	81,005	10,194	3,535	216	29,758	2,208	45,911	56.70	35,094	23,792	17,189	36,732
	12 mos.	6	.....	.....	1,111,430	118,268	43,962	2,464	418,007	24,050	606,751	54.60	504,679	487,099	425,939	278,148
Texas & Pacific	Dec.	1,952	2,090,982	691,787	3,078,318	445,277	2,234,879	47,277	1,069,697	93,269	3,933,319	127.80	—855,001	—960,020	—1,073,579	—980,928
	12 mos.	1,951	24,346,031	8,686,959	35,600,474	5,748,559	8,404,106	611,309	13,777,591	1,269,504	30,138,446	84.70	5,462,028	4,013,846	2,832,148	—706,253
Toledo, Peoria & Western	Dec.	247	103,899	49,270	163,434	24,829	42,177	3,573	27,437	7,849	105,845	64.80	57,589	50,047	47,392	—172,915
	12 mos.	247	996,267	568,624	1,692,410	377,364	503,619	37,233	886,153	95,358	1,900,980	112.30	—208,570	—326,227	—308,649	—294,668
Toledo, St. Louis & Western	Dec.	454	721,519	30,131	785,990	147,948	204,504	19,196	322,759	17,386	711,670	90.50	74,320	30,862	—28,580	129,869
	12 mos.	454	8,737,449	365,358	9,503,970	1,531,323	1,966,428	243,932	3,383,736	194,390	7,319,062	77.00	2,184,908	1,746,432	1,355,565	1,369,587
Trinity & Brazos Valley	Dec.	368	416,674	27,386	460,679	72,223	92,476	3,073	209,609	10,442	387,823	84.20	72,856	70,281	—1,620	41,566
	12 mos.	368	3,142,166	245,829	3,501,011	653,700	615,588	35,396	1,369,260	121,449	2,794,613	79.80	706,398	624,926	282,720	—529,477
Ulster & Delaware	Dec.	128	56,993	20,308	105,513	17,361	29,489	1,820	64,522	7,988	121,773	115.40	—16,260	—23,260	—28,362	—258,537
	12 mos.	128	846,016	537,396	1,713,501	237,226	277,505	35,396	917,667	100,215	1,575,656	92.00	137,845	55,187	—12,430	—594,830
Union Pacific	Dec.	3,665	5,829,178	1,294,353	3,369,448	1,031,187	1,664,495	102,228	2,669,044	280,191	5,913,473	70.70	2,455,975	2,063,814	1,923,115	1,474,731
	12 mos.	3,622	84,377,064	19,438,055	114,783,971	13,063,914	22,750,820	1,675,353	34,089,947	3,864,979	776,12,030	67.60	37,171,941	30,759,314	28,351,910	29,847,528
Oregon Short Line	Dec.	2,366	2,125,123	421,855	2,868,188	409,092	520,852	52,346	975,145	115,576	2,122,793	73.90	745,395	680,991	637,662	331,404
	12 mos.	2,360	27,701,720	6,068,743	36,843,202	5,909,264	6,894,833	526,899	11,923,090	1,490,727	27,412,139	74.40	9,431,063	6,284,629	5,630,965	9,499,281
Oregon-Wash. Ry. & Nav.	Dec.	2,218	1,685,513	465,545	2,486,900	509,673	376,854	55,032	1,189,458	143,648	2,299,010	92.40	187,890	36,241	—52,896	—612,725
	12 mos.	2,222	20,849,206	6,240,256	29,818,740	6,242,811	5,009,591	710,589	12,603,757	1,630,012	26,577,578	89.10	3,241,162	1,041,042	—126,427	—85,541
St. Joseph & Grand Island	Dec.	258	208,162	25,270	250,391	37,957	28,363	2,407	110,104	12,308	191,139	76.30	59,252	4,859	9,052	—80,851
	12 mos.	258	2,798,733	351,688	3,355,356	686,036	564,227	31,070	1,473,387	165,025	2,919,667	87.00	435,689	223,040	141,070	—473,382
Union of Pennsylvania	Dec.	45	.....	.....	702,817	44,720	211,132	98	318,049	6,138	580,136	82.50	122,681	—160,946	—70,407	63,996
	12 mos.	45	.....	.....	9,435,212	741,476	2,484,877	2,568	4,394,776	87,238	7,710,795	81.70	1,724,417	1,342,040	2,139,492	1,144,782
Utah	Dec.	104	96,008	953	97,644	20,053	29,873	- 312	25,887	4,716	80,841	82.79	16,803	1,095	—11,351	55,670
	12 mos.	100	1,192,083	7,617	1,213,535	273,655	386,646	4,705	305,351	49,210	1,010,336	83.26	203,199	86,654	—9,423	717,020
Virginian	Dec.	526	952,359	76,555	1,165,946	264,294	323,020	9,396	439,055	33,174	1,043,007	89.50	122,939	73,562	66,050	275,246
	12 mos.	526	15,681,361	956,580	18,024,357	2,547,899	3,902,349	123,080	5,540,614	369,514	2,405,728	68.80	5,618,629	4,575,084	4,726,940	4,776,886
Wabash	Dec.	2,472	3,295,273	778,931	4,447,831	574,134	908,025	112,769	2,359,440	155,395	4,129,548	92.80	318,283	135,266	—132,488	61,941
	12 mos.	2,472	45,688,528	9,931,246	59,217,692	9,210,291	11,843,730	1,341,678	25,726,606	2,028,804	50,506,169	85.30	8,711,523	6,846,804	3,863,340	—5,491,512
Western Maryland	Dec.	804	1,235,576	80,430	1,406,716	228,988	252,734	29,531	466,085	57,467	1,049,266	74.60	357,450	300,752	271,695	238,694
	12 mos.	801	15,507,930	1,152,428	17,643,054	2,324,954	3,896,208	346,165	6,463,576	614,851	13,866,529	78.60	3,776,525	3,069,827	3,074,515	382,939
Western Pacific	Dec.	1,041	586,129	114,612	775,210	153,903	165,565	32,873	339,521	298,478	1,006,489	129.80	—231,279	—537,758	—464,903	—240,673
	12 mos.	1,016	8,972,847	2,323,282	12,100,611	2,169,384	2,339,158	378,797	4,581,962	717,909	10,425,669	86.10	1,674,942	388,743	851,995	2,901,977
Wheeling & Lake Erie	Dec.	511	785,770	79,295	938,199	100,122	218,329	18,296	451,539	51,627	843,431	89.90	94,768	—32,028	—50,899	—93,785
	12 mos.	511	12,708,914	952,334	14,770,707	1,910,291	3,401,301	183,697	5,676,657	477,122	11,666,450	79.00	3,104,257	2,035,748	1,755,356	—401,694
†Yazoo & Mississippi Valley	Dec.	1,381	1,245,604	447,588	1,771,044	281,610	703,355	25,055	557,302	53,110	1,599,161	90.30	171,883	87,852	95,740	238,513
	12 mos.	1,381	15,385,060	4,284,094	20,759,409	4,280,996	4,845,961	303,953	8,485,636	643,938	18,526,841	89.20	2,232,568	876,009	812,049	—186,636

* Tentative report.
** Estimated report.
† Corrected report.
††Preliminary tentative statement.

Traffic News

The Norfolk & Western has reopened its commercial office in Little Rock, Ark., with F. W. Hampson in charge as commercial agent.

The Akron Traffic Association, Akron, Ohio, has elected the following officers for 1922: president, E. W. Swartz; vice-president, E. L. Morgan; treasurer, C. M. Groninger; secretary, H. L. Sovacool; directors, C. W. Meacham, F. M. Evans, Jr., E. J. Stubbs and H. X. Knox.

Coal Production Increasing

The total output of bituminous coal during the week ended February 11 is estimated by the Geological Survey at 10,326,000 tons, an increase of 620,000 tons over the preceding week. Except for the latter part of October when consumers were stocking up in anticipation of a possible railroad strike, this was the largest output attained in any week in the coal year 1921-22.

Time for Filing Overcharge Claims Extended

The House on February 20 passed the bill to extend the time for filing straight overcharge claims against the Railroad Administration from March 1, 1921, as provided in the transportation act, to September 1, 1922, and to extend the time for filing suits on awards of reparation by the Interstate Commerce Commission until one year from the date of the commission's decision. The bill had been passed by the Senate but an amendment was added in the House to allow a longer time and the Senate on February 21 passed the bill as amended in the House.

Freight Traffic in 1921

Traffic statistics filed with the Interstate Commerce Commission show that during 1921 there was a falling off in the freight traffic of the country of approximately 23.3 per cent compared with the volume the previous year. The decline was the greatest both relatively and absolutely that the railroads of the United States have ever suffered in the course of a single year. The net ton miles, totaled 344,167,000,000 or 104,390,000,000 less than in 1920.

The greatest decrease was in the Eastern district where the net ton miles for the year amounted to 172,394,000,000, a reduction of 55,906,000,000 or 24½ per cent. The Western district showed a reduction of 22½ per cent, or 36,910,000,000 below 1920; and the Southern district 20.6 per cent or 44,729,000,000 in 1921 compared with 56,303,000,000 in 1920.

Reports for December from all but one road, the Detroit, Toledo & Ironton, showed a reduction in traffic on the railroads of the nation of 25.9 per cent compared with the same month the year before total 25,707,000,000, or 8,963,000,000 less than December, 1920.

The compilations are based on reports from carriers representing a total length of road of 233,459 miles.

THE SAFETY REPORT of the Chicago Great Western for 1921 shows that no passenger was killed on the entire system; and not an employee was killed on the Western division. There was no reportable injury of an employee on the Western division in 126 days, and none on the Northern division in 118 days.

APPOINTMENT OF A RECEIVER for the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers was asked in a petition filed by the Bacon Brothers Company of Toledo, Ohio, in the federal court at that city on February 16, the receiver to take possession of all property of the brotherhood, including funds in the Brotherhood of Locomotive Engineers' Co-operative Bank. This application is supplementary to the original complaint filed several months ago, in which the union was sued for breach of contract to the amount of several hundred thousand dollars in damages.

Commission and Court News

Interstate Commerce Commission

The commission has suspended until June 10, the operation of proposed reductions varying from 1½ to 4 cents per 100 lbs. in the rates on grain from points on the Illinois Central in Illinois to New Orleans, for export to Europe.

A hearing on advances in cotton rates has been scheduled for March 13, before Examiner Cassidy, of the Interstate Commerce Commission, at Memphis, Tenn. It involves increases in cotton rates affecting all points in the Mississippi Valley. The carriers proposed a rate of $1.37 per 100 lb. from Memphis, to Boston, Mass., and other eastern points, and of 90 cents from Memphis to New Orleans, La. The present rate is $1.12 from Memphis to Boston and 69 cents from Memphis to New Orleans.

Investigation of Rates on Bunker Coal

The commission on its own motion has instituted an investigation into rates on bunker coal, from all points of origin to all ports of the United States. Many of the carriers serving Atlantic ports make lower rates on coal to such ports for use in bunkering vessels than they make on coal to the same ports for local use. The investigation will deal primarily with the lawfulness and propriety of the practice of discriminating in such rates. A hearing has been scheduled for March 20, at Washington, before Examiner W. P. Bartel.

Investigation of Freight Rates in Southern Territory

At the request of carriers operating within southern territory and of many interested shippers, the commission on its own motion has instituted an investigation of the class rates applicable in interstate commerce to, from and within southern territory.

The rates in question, in many instances, differ materially for substantially similar hauls on like classes of traffic and the relationship to first class of the rates on the lower classes varies greatly in many cases. The investigation is favored by most of the commissions of the southern states. The carriers have been working upon a revision of the rates for many months. Intrastate rates have not been included within the scope of the investigation, but the commission in reaching conclusions with respect to the interstate rates will consult with the state commissions and is confident of their co-operation.

State Commissions

The Minnesota Railroad and Warehouse Commission is preparing to file a petition of intervention with the Interstate Commerce Commission in the case of the Sioux City Live Stock Exchange vs. the Chicago, St. Paul, Minneapolis & Omaha, and the Great Northern. It is claimed that there is discrimination against the state of Iowa resulting from the Minnesota commission's order allowing live stock shippers to be carried back to their homes free. This is not permitted in Iowa and shippers in that state are taking advantage of Minnesota's free fare inducement to take their stock to the South St. Paul market.

Personnel of Commissions

George R. Edwards, member of the state railroad commission of Mississippi, has resigned.

Court News

Provisions for Handholds and Sill Steps

The New York Appellate Division holds that the requirements of the Safety Appliance Act of 1893 as to handholds, and of the act of 1910 as to sill steps, were not suspended by the Interstate Commerce Commission's orders of March 13, 1911, and November 2, 1915.—Green v. L. V., 191 N. Y. Supp., 489.

Foreign Railway News

Dutch Secure Chinese Bridge Contracts

LONDON.

The Netherland Syndicate, Ltd., has been authorized by the Chinese government to place orders in Holland for the construction of 150 railway bridges of various spans. These bridges are for the eastern part of the Lunghai Railway which is now under construction.

West Australian to Build Locomotives

LONDON.

The West Australian government will shortly be in the market for the supply of drills, milling machines, plate rolls, grinders and other equipment to the value of £20,000 (or $97,200 at the normal rate of exchange), to enable the railway workshops to undertake the construction of locomotives.

Electrification in Czecho-Slovakia

LONDON.

A Reuter cable states that plans for railway electrification in Czecho-Slovakia extend over a period of 20 years. A great saving in coal is expected. The first lines to be electrified are those converging on Prague with a radius of 30 miles in order to avoid the transport of coal to the capital.

Deplorable Condition of Russian Railroads

LONDON.

The Russian railways are in a deplorable condition owing to the lack of supplies. On January 1, 1917, the serviceable mileage was approximately 44,000. On January 1, 1921, it was only about 29,000 miles. The number of locomotives in good condition on January 1, 1917, was 17,012, of which 36 were new. On January 1, 1921, the number was 2,921, of which 35 were new. The percentage of unserviceable locomotives on January 1, 1917, was 16.8 per cent. On January 1, 1921, it was 64.2 per cent.

Danish Railway Rate Reduction Proposed

LONDON.

Although the Danish State Railways show a deficit for the half year ending October, 1921, the Danish Traffic Minister has introduced a bill reducing freight rates from between 12½ per cent to 33⅓ per cent. Passenger rates will be reduced by about 10 to 12 per cent for the third class and the new second class fares will be approximately 80 per cent higher than in 1914. Zone rates will be maintained, but reduced for longer distances. The extra charge for express train tickets will be reduced to less than half of the present charge.

Unbusinesslike Accounting on Belgian State

The Belgian State Railway Administration has decided to change its accounting methods, according to the Wall Street Journal. Heretofore it has been the custom to begin each year with a clean slate. Deficits or surpluses were not carried over. Consequently the State Railway could suffer a loss one year and make a slight profit the next, and when the statement for the second year was given out it would appear that the railways were in good financial shape. Hereafter the railways will be expected to justify themselves over a period of years.

Mexican Government Wants Southern Pacific to Build Line

Amado Aguirre, secretary of the Department of Communications and Public Works of Mexico, says that the government is anxious to have the Southern Pacific of Mexico complete its branch line between Tepic and La Quemada, as by establishing a junction at Orendain it would connect with the National Railways of Mexico and form a direct line from Mexico City to Nogales, Sonora. This branch may be extended later via Plan de Barrancas or the Pajaritoa range, but it is probable that the first point will be chosen. Notwithstanding the fact that the canyons at Plan de Barrancas are deeper, it is probable that this route will be selected as the line will thereby be shortened a number of miles and several curves avoided, it is stated.

It is announced that the Southern Pacific is willing to extend this branch in view of the benefit to be derived from the greater volume of freight and passenger business, which would connect with the National Railways of Mexico, but that this is impossible at present, due to extensive repairs on the line now in operation, made necessary by the deterioration suffered during the revolutionary period.

Mexico Defends Holding of Interoceanic

In response to the recent formal and emphatic demand of the British shareholders of the Interoceanic Railroad that that property be returned to them by the Mexican government, the official explanation is made in Mexico City that under the original concession granted for the construction and operation of this road it was expressly provided that the government could take it over in time of military necessity. This was done during the revolutionary period and it is asserted that the "military necessity" still exists, not only as to the operation by the government of the Interoceanic but of the other former individual properties that now comprise the National Railways of Mexico. The authoritative statement also is made here that "the government is excused from paying damages and indemnity, accrued during the revolutionary period until a final liquidation and return of the railroad is effected."

According to a statement issued by Manuel Padres, chairman of the board of directors of the National Railways of Mexico, the Interoceanic is not operated under lease by that company. He said that the Mexican government owns 55 per cent of the stock of the Interoceanic Railway and that the action of the minority stockholders at their meeting in London is of no legal effect.

New Working Rules in Germany

LONDON.

The new regulations regarding working hours on the German railways have been agreed to, according to Modern Transport (London). In principle they maintain the eight-hour day, but at the same time aim at a more rational and economic use of all the employees. The scheme deals with the actual working hours, the daily rest time and the number of rest days. It points out that the conditions and degrees of employment within the railway service are widely different from those generally prevailing in industry and other fields of employment and it differentiates between hours of actual work and hours when men are required only to be present or available, but are not doing any work. As the nature of the latter class of hours varies materially, rules have been drawn up as to whether and to what extent this time of being in readiness can be counted as part of the 8 working hours.

This should make it possible in some cases to have only two shifts for 24-hours instead of three. In other words the eight-hour day should be transformed into eight working hours. The "service shift," or the aggregate of the actual hours of work including the time the men are to be in readiness, the pauses and the service trips, is not to exceed 15 hours, but the duration is subject to various circumstances and regulations, and the maximum will only come into operation when a minimum of service or work is required from the men. The minimum hours of rest if spent at home are to be eight consecutive hours and 10 hours for the train service men. The number of rest days will not be less than 52 during a year, each of at least 32 consecutive hours. Under circumstances of extra heavy traffic or other emergencies the railways are at liberty to exceed the regular working time of any of their employees.

A BILL has been introduced in the legislature of Kentucky seeking to give to the Railroad Commission of that state the same power over intrastate transportation that the Interstate Commerce Commission has over interstate affairs.

Equipment and Supplies

Equipment Program of the St. Louis-San Francisco

The St. Louis-San Francisco has authorized the expenditure of $7,766,000 in 1922 for new equipment, the repair and improvement of old equipment and other improvements included in the amount is $1,260,000 for 8 steel coaches, 6 steel chair cars and a 150-ton steam derrick; $360,000 for rebuilding 250 steel coal cars; $300,000 for rebuilding 9 locomotives; $1,431,000 for bettering existing equipment; $205,000 for new power plants; $328,000 for rock blasting; $280,000 for permanent concrete bridges; $46,000 for new fences; $35,000 for new water-treating plants; and $87,500 for improvement of coaches in branch line service. All mail and mail apartment cars are to be entirely rebuilt; baggage cars are to be improved; 7,000 freight cars rebuilt; 1,150 furniture and vehicle cars to be improved; and electric lights to be installed in coaches on branch lines, and steel underframes to be placed in all wooden coaches.

Locomotives

MITSUI & Co., New York City, are inquiring for 11 tank locomotives, 2-4-2 type; also for 2 internal combustion locomotives adapted for kerosene, of 30 in. gage. All these locomotives are for service in Japan.

THE SOUTHERN RAILWAY is rebuilding 25 consolidation type and 20 Pacific type locomotives in its own shops. These locomotives will be equipped with superheaters and Chambers throttle valves. Outside valve gear will be added to the locomotives not yet equipped with this device.

Passenger Cars

THE DELAWARE & HUDSON is asking for prices on 15 coaches and 2 buffet cars.

THE GREAT NORTHERN, noted in the *Railway Age* of November 26 (page 1068), as inquiring for 35 passenger cars has withdrawn this inquiry.

CENTRAL OF NEW JERSEY.—This company, which was reported in the *Railway Age* of February 11 as inquiring for 25 passenger cars, 10 combination passenger and baggage and 10 baggage cars, has ordered 25 coaches from the American Car & Foundry Company; also 10 cars from the Bethlehem Shipbuilding Corporation, Harlan Plant, and 10 from the Standard Steel Car Company.

Freight Cars

THE ATLANTIC COAST LINE is inquiring for 100 Steel phosphate cars.

THE PEORIA & PEKIN UNION is inquiring for from 25 to 35 gondola cars.

THE CENTRAL OF BRAZIL, is inquiring through the car builders for 10 freight cars.

THE ASIATIC PETROLEUM COMPANY, 233 Broadway, New York City, is inquiring for 100 tank cars, of 4,000 gal. capacity, for service in Italy.

THE SOROCABANA RAILWAY (Brazil) is inquiring through the car builders for 300 stock cars, of 12 tons capacity and for 200 gondola cars, of 28 tons capacity.

THE CERRO DE PASCO COPPER CORP., 15 Broad street, New York City, is inquiring for from 20 to 40 steel concentrate cars; also for 4 all-steel hopper cars, of 60 tons capacity.

THE PACIFIC FRUIT EXPRESS reported in the *Railway Age* of January 21, as inquiring for 3,300 refrigerator cars, has ordered 2,600 of these cars, from the Standard Steel Car Company.

THE UNITED FRUIT COMPANY, New York City, reported in the *Railway Age* of January 28, as inquiring for 50 fruit cars, has ordered 50 fruit cars of 20 tons capacity from the Magor Car Company. These cars are for use on the Tela Railway, Honduras.

THE GREAT NORTHERN, reported in the *Railway Age* of November 19, 1921, as inquiring for 500 refrigerator cars, has ordered this equipment from the General American Car Company; also 500 all steel gondola cars from the Pressed Steel Car Company, and 500 stock cars from the Pullman Company.

Iron and Steel

THE CHESAPEAKE & OHIO is inquiring for 21,000 tons of rail, including 3,000 tons for the Hocking Valley Railway.

THE CHICAGO UNION MAIL TERMINAL has ordered 370 tons of conveyor and structural steel supports from the Pittsburgh Bridge & Iron Company.

THE BANGOR & AROOSTOOK recently placed an order with the Bethlehem Steel Company for 2,000 tons of 80-lb., open hearth steel rails, with angle bars to fit.

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, March 3, for 23,000 tons of fabricated steel, for the proposed bridge over the Hudson river at Castleton, N. Y.

Track Specialties

THE HARBOR DEPARTMENT OF LOS ANGELES, CAL., will open bids on March 3, for miscellaneous supplies including 30 frogs, 30 switches, 30 stands and other track material.

THE CINCINNATI NORTHERN is inquiring for 300 kegs of track bolts and 10,000 tie plates, for which bids are to be submitted to W. J. Hiner, Cincinnati, Ohio, on or before 12 o'clock noon of February 27.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 2,975 kegs of track bolts, 81,200 tie plates, 300,000 galvanized tie dating nails, bids for which are to be submitted to W. J. Hiner, Cincinnati, Ohio, on or before 12 o'clock noon February 27.

Machinery and Tools

THE RICHMOND, FREDERICKSBURG & POTOMAC has placed orders for some tools for the repair of elliptical springs.

Miscellaneous

THE NEW YORK CENTRAL will receive bids until 12 o'clock noon, March 6, on its requirements of track bonds; the furnishing, delivery and erection of one 2,000 k.w. synchronous motor generator set, appurtenances, switchboards, wiring and work of such character.

Grand Central Terminal, New York

Supply Trade News

The **Eymon Crossing Company,** Marion, Ohio, has opened an eastern office in Boston, Mass., in charge of **G. T. Wiswell,** formerly with the New York, New Haven & Hartford.

The **Ryan Car Company** has increased its capital stock from $2,500,000 to $6,000,000, by the issuance of 35,000 shares of additional common stock with a par value of $100 per share.

The **Barnes Railway Rail Brace Company** has been organized at Willis, Tex., by **M. E. Barnes** of that city; **Mack Hannah,** of Port Arthur, Tex., and **C. H. Long,** San Antonio, Tex.

T. J. O'Meara, office and construction engineer and formerly assistant signal engineer of the New York Central at Albany, N. Y., has entered the service of the **Hall Switch & Signal Co.,** Garwood, N. J., as electrical engineer, effective February 15.

Pendleton E. Lehde has been appointed a special representative in the state of Louisiana and the southern part of Mississippi of the **Roller-Smith Company,** New York City. Mr. Lehde's headquarters are at 609 Whitney central building, New Orleans, La.

C. L. Dewey, formerly associated with the Dewey Cement-Gun Company, and the Traylor-Dewey Contracting Company, Allentown, Pa., is now with the **Cement-Gun Construction Company,** Chicago, and will devote his time to the development of cement-gun contract work.

General Railway Signal Company

For the year ended December 31, 1921, the General Railway Signal Company reports earnings of $146,575, as compared with $748,358 for 1920. The surplus December 31, 1921 was $554,629, as against $975,684 at the close of 1920.

Referring to the recent automatic train control order of the Interstate Commerce Commission, the annual report says:

"For more than ten years your company has been engaged in the development of both automatic train stop and automatic train control devices and has made and patented many valuable inventions, and has by purchase and license acquired rights under many other patented inventions in these fields. We are, therefore, in an excellent situation to furnish high grade, dependable devices of the required character as well as the block signaling systems in conjunction with which they should be employed."

Pressed Steel Car Company

The earnings of the Pressed Steel Car Company for the year ended December 31, 1921, after deducting for depreciation, obsolescence, etc., were $681,906. In 1920 the company reported net profits of $2,531,805. Dividends on the common stock were reduced from $1,000,000 in 1920 to $250,000 in 1921. On the preferred stock $875,000 was paid in both years, making the total amount paid in dividends $1,125,000 in 1921, as compared with $1,875,000 in 1920. The working capital—surplus and undivided profits—on December 31, 1921, was $14,677,900.

The general balance sheet shows inventory valued at $2,939,771, against $11,237,622 at the close of 1920. Cash on hand was $1,497,192, against $2,954,137, and notes and accounts receivable $7,525,167, against $9,052,208. Accounts and notes payable were reduced from $14,080,724 to $3,663,915.

The annual report signed by President F. N. Hoffstot says in part:

Your company's business is so indissolubly linked with the business of the railroads that anything that affects them affects us. Before the war the railroads were about adjusted to new conditions resulting from the supervision of their business by the Interstate Commerce Commission and would have replaced their depleted equipment had it not been necessary to bend their energies first to help meet the extraordinary demands from abroad and then after the United States entered the war, to support our war program. Then quickly followed government control of the railroads, resulting ultimately, by the granting of increased wages, in the entire overturning of the rules for employment, established as a result of many years of experience. Since the armistice, one by one the pegs supporting this government protection have been removed, but unfortunately this action was not uniform or intelligent.

We are often asked the question, "When will the railroads begin buying?" When they have difficulty in taking care of their overhead charges, let alone setting aside anything for surplus, and must contend with high costs and a reduced volume of traffic, they cannot be expected to incur liabilities for the purchase of rolling stock, particularly at a time when a large part of the equipment they own is not in service, nor will they have a volume of traffic to produce increased revenues unless the manufacturers along their lines are operating successfully.

When car business does revive there will be, in addition to the work we have had in former years, considerable "heavy repairs," as large cars built 20 years ago are only now beginning to need substantial repairs, and few railroads are fitted to do this work as economically as car shops.

Indications point to a large demand for passenger cars, as for years few have been bought, and while this is not an important factor with us, it will help. During the year we took a substantial order for China, which we hope to complete early this year.

Obituary

William C. Sargent for 22 years secretary and also a director of the Chain Belt Company, Milwaukee, Wis., died on February 5. Mr. Sargent was born at Troy, N. Y., on February 2, 1849. In 1871 he went to St. Paul, Minn., and in 1900 became secretary and later a director of the Chain Belt Company, Milwaukee. He was also a director of the Federal Malleable Company, West Allis, Wis.

Joseph E. Schwab, formerly (from 1902 to 1904), president of the American Steel Foundries Company, at New York, died at his home in New York City on February 17, at the age of 57. He was born at Loretto, Pa., and joined the Carnegie Company two years after his brother, Charles M., became identified with it and since that time they were closely associated in various business enterprises. Joseph Schwab served as an engineer in the Carnegie Company until 1894, when he became manager of its Duquesne works. When the United States Steel Corporation was formed, he left the Carnegie Company to become assistant to his brother, the president of the corporation. Two years later he became president of the American Steel Foundries Company and, after a few years, he retired from active participation in industrial properties.

Trade Publications

GASOLINE POWER UNITS.—The Buda Company, Chicago, has issued bulletin No. 388, describing a four-cylinder gasoline power plant, which it has recently developed for use in driving electric generators, arc welding sets, triplex or other types of pumps, hoists, concrete mixers, air compressors and for similar uses in machine shops, etc.

ELECTRIC ENGINE COALERS.—The Robert & Schaefer Company, Chicago, has just issued a four-page folder illustrating locomotive coaling equipment involving the use of an inclined elevator. The descriptions cover plants without elevated storage where the cars and the track hopper afford the storage, the coal being dumped directly from the elevating bucket into the locomotive tender.

GENERATOR COOLING APPARATUS.—The B. F. Sturtevant Company, Boston, Mass., has issued Bulletin No. 246 describing and illustrating in detail its generator cooling apparatus. A psychrometric diagram showing the percentage of relative humidity has also been included in the bulletin which contains 27 neatly arranged pages.

COALING STATION EQUIPMENT.—The Howlett Construction Company, Moline, Ill., has issued a 25-page, loose-leaf booklet, describing the types of coaling stations it erects, together with its line of coaling station equipment. This equipment consists principally of coal gates and aprons, electric hoists, hoisting buckets, car pullers, etc., all of which are illustrated by half-tones and line drawings.

Railway Construction

AMERICAN RAILWAY EXPRESS.—This company is constructing a new brick and concrete station and office building at Sweetwater, Tex.

ATCHISON, TOPEKA & SANTA FE.—This company, which was noted in the *Railway Age* of February 11 (page 401) as having closed bids for the construction of a branch line from Santanta, Kan., to a point 55 miles westward, the cost of which was estimated at $1,400,000, has awarded the contract for this work to Scott & White, St. Louis, and construction will be started at an early date. The same company will construct four small store department buildings at Topeka, Kan., estimated to cost $15,000. A new bridge will be constructed over Stranger Creek, a short distance northwest of Potter, Kan. One-story brick section houses will also be constructed at Strong City, Kan., Cherryvale and Ottawa Junction, estimated to cost approximately $7,500 each.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Railway Water & Coal Handling Company, Chicago, for the construction of a steel coal chute at Bridgeport, Tex., estimated to cost about $30,000. The same company contemplates the construction of a two-story brick freight house at Omaha, Neb., estimated to cost $70,000, and a one-story brick passenger station at Graham, Tex., estimated to cost $25,000.

ELGIN, JOLIET & EASTERN.—This company, in conjunction with Chicago & Joliet Electric, and the state highway department of Illinois contemplates the construction of a viaduct over the tracks at East Cass street, Joliet, Ill.

ILLINOIS CENTRAL.—This company closed bids on February 23, for the installation of a pipe line at Centralia, Ill., to extend from the city water main in that city to the company's yards, a distance of about 3 miles.

ILLINOIS CENTRAL.—This company contemplates the construction of a freight and passenger station at Clarksdale, Miss., estimated to cost $250,000, of which the city and commercial organizations at that point will bear a proportion of the expense.

INTERNATIONAL & GREAT NORTHERN.—This company has been requested by the state railroad commission of Texas to rebuild its bridge over Greens Bayou, near Aldine, Tex.

KANSAS & OKLAHOMA SOUTHERN.—This company has been authorized by the Interstate Commerce Commission to construct a line from Caney, Kan., to Vinita, Okla., a distance of 61 miles, and a further extension from Vinita, Okla., northwest for a distance of about 10 miles into the coal mining district of that state.

LOS ANGELES & SALT LAKE.—This company will construct a new freight station at Long Beach, Cal., and has applied to the railroad commission of that state for permission to construct standard gage tracks on certain streets in that city for the purpose of serving the proposed station.

LOUISIANA RAILWAY & NAVIGATION.—This company, which was noted in the *Railway Age* of January 28 (page 303) as having preliminary plans prepared for the construction of a passenger station at New Orleans, La., has petitioned the railroad commission of that state, and the city council of New Orleans for permission to extend its tracks in that city and to construct the station at Gerod and South Romfort streets. The city has demanded that the cost of the station must not be under $125,000, and also that the municipal government shall not be held liable for injury to private property in that neighborhood.

MINARETS & WESTERN.—This company has awarded a contract to the Mercer-Fraser Company, Eureka, Cal., for the construction of a bridge over the San Joaquin river at Friant, Cal., the cost of which is estimated at $90,000. The structure will be 1,300 ft. in length, of which 400 ft. will be of steel construction.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—This company contemplates the construction of new terminal facilities at Park Falls, Wis. A roundhouse, repair and machine shops, car sheds and other necessary buildings will be constructed at that point at an estimated cost of $500,000.

NEW YORK CENTRAL.—This company is contemplating the construction of a steel highway bridge, 125 ft. in length, near Syracuse, N. Y., to carry the Newark-Lyons highway over its tracks, eliminating a grade crossing.

NEW YORK, NEW HAVEN & HARTFORD.—This company in applying to the Interstate Commerce Commission for a government loan, including $3,000,000 for additions and betterments, lists the following among other proposed expenditures for the coming year: Rail and other track material, $700,000; additional main tracks, $100,000; additional yard tracks and sidings, $500,000; signals and interlocking, $300,000; shop buildings, engine houses, etc., $150,000; electric power plants, etc., $600,000; improvements to freight cars, $150,000; and improvements to locomotives, $100,000.

PERE MARQUETTE.—This company is preparing plans for the construction of new shops at Wyoming (Grand Rapids), Mich., estimated to cost $1,400,000. This company will also construct a swing bridge over the Saginaw river at Saginaw, Mich., and a bascule bridge over the Black river at Port Huron, Mich., estimated to cost $700,000. The Flint Belt line which was started last year will be completed at once at a total cost of $650,000.

PHILADELPHIA & READING.—This company has awarded a contract to the Bader Construction Company, Atlantic City, N. J., for the construction of a third track between Haddon Heights, N. J., and Magnolia, a distance of 2.7 miles. Creosoted ties, stone ballast and 100-lb. rail will be used. At each end of the third track section an interlocking plant will be installed.

RAILWAYS ICE COMPANY.—This company is constructing a one-story brick icing station, 275 ft. by 100 ft., at Clearing, Ill., at an estimated cost of $350,000. It will be completed by April 15, and operated by the above company for the Belt Railway of Chicago.

SALT LAKE & UTAH.—This company has been authorized by the Public Utilities Commission of Utah to construct an extension to its line from Springville, Utah, into the Uintah basin, the work to be completed within two years.

SAN ANTONIO & ARANSAS PASS.—This company has under consideration improvements and betterments to its property at Waco, Tex., estimated to cost between $30,000 and $40,000. No definite decision has been made as to when the work will be undertaken.

ST. LOUIS-SAN FRANCISCO.—This company will spend $1,691,000 during the current year for track extensions and the replacement of rails. A second main track will be constructed between Spring Hill, Kan., and Paola, a distance of about 13 miles, and between Windsor Springs, Mo., and Valley Park, a distance of approximately 5 miles; $673,000 will be spent for grade revision work between Crocker, Mo., Garnsey, and St. John; $280,000 for new power plants; and, $25,000 for water treating plants. This same company will receive bids until March 1, for the remodeling of its Harvey eatinghouse at Sapulpa, Okla., which is estimated to cost approximately $65,000.

TRINITY & BRAZOS VALLEY.—This company will reconstruct a station at Donie, Tex., and one at Coolidge, both of which were recently destroyed by fire.

APPOINTMENT of a receiver for the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers was asked in a petition filed by the Bacon Brothers Company of Toledo, Ohio, in the federal court of that city on February 16, the receiver to take possession of all property of the brotherhod, including funds in the Brotherhood of Locomotive Engineers' Cooperative Bank. This application is supplementary to the original complaint filed several months ago, in which the union was sued for breach of contract to the amount of several hundred thousand dollars in damages.

THE BOSTON & MAINE has decided to sell advertising space in passenger cars and in station buildings and has made a contract with George W. Roebling, advertising agent, of New York.

Railway Financial News

BIRMINGHAM & NORTHWESTERN.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $400,000 of first mortgage 6 per cent refunding bonds to refund an issue due March 1.

CHICAGO, PEORIA & ST. LOUIS.—*Asks Authority to Issue Certificates.*—The receivers have applied to the Interstate Commerce Commission for authority to issue $335,000 of one-year certificates of indebtedness at 7 per cent.

DELAWARE, LACKAWANNA & WESTERN.—*New Directors.*—Samuel Sloan, P. R. Pyne, H. B. Spencer, R. C. Gasser and Frank Rysavy have been elected directors to succeed William Rockefeller, George F. Baker and H. S. Vanderbilt, who resigned recently, in accordance with the Interstate Commerce Commission's ruling on interlocking directorates, and H. A. C. Taylor and M. Taylor Pyne, deceased.

DENVER & RIO GRANDE.—*Perkins Committee Criticises Reorganization Plan.*—The committee headed by James H. Perkins, president of the Farmers' Loan and Trust Company, representing the first and refunding 5 per cent bonds, has issued a statement to holders of these securities, setting forth the committee's reasons for opposing the Western Pacific's reorganization plan of the Denver & Rio Grande. The Perkins committee opposes forcing through any plan without proper opportunity for investigating its fairness or for determining whether better terms are available from others than the Western Pacific. The committee has extended to April 1 the time limit for deposit of bonds with the committee.

The statement of the Perkins committee says:

There is a large equity in the Denver & Rio Grande property which the Western Pacific plan does not recognize and it is believed that other proposals for reorganization can be obtained which are decidedly more favorable. For this reason bondholders who have deposited with the so-called Hammond committee should withdraw before February 27 to prevent the Western Pacific plan from going through by default. The Hammond committee has been in existence five years and during that time has been acting with the Western Pacific. On February 1 last the Western Pacific permitted default in the interest on the refunding bonds. They have chosen the moment to make the default (and the time of default is entirely a matter of their own choosing) when the Denver property has not as yet fully recovered from the serious Colorado flood damage of 1921 and when general railroad earnings are at the lowest point, in their endeavor to force the bondholders into accepting this plan by which the bondholders turn one-half of their holdings into preferred stock and permit a new mortgage ahead of the bonds.

ILLINOIS CENTRAL.—$50,000,000 *Preferred Stock Issue Planned.*—The stockholders, at the annual meeting on April 19, will be asked to authorize an issue of $50,000,000 preferred stock, to be sold at various times, for the purpose of electrifying the road's lines in Chicago, reconstructing its Chicago freight and passenger terminals and improving other property in that city. As the work which the issue will finance is expected to spread over a period of 18 years, according to the letter which President C. H. Markham sent to all stockholders describing the plan, the stock will be offered ratably to common stockholders. Those who do not care to subscribe will be given opportunity to dispose of their subscription rights.

President Markham's statement outlining the plans is in part as follows:

New capital will be required by the company principally for electrification of its lines within the City of Chicago, reconstruction of its principal passenger station and freight terminals there and improvement of lands acquired under the contract ordinance with that city passed July 21, 1919. The work is to be done within the next 18 years and is divided into various stages running over that period. The ordinance was accepted after much consideration in the belief that the improvements contemplated will be productive and remunerative and will permit the use for railroad purposes of much valuable real estate of the company which otherwise would be practically useless.

The board of directors has decided that the financing necessary to carry out these improvements can best be done by issue of preferred stock. Increasing the amount of capital stock relative to bonded indebtedness increases safety, since thereby no addition is made to fixed charges which must be met. The effect should be to improve the credit of the company and enable it to borrow upon more favorable terms in the future if and when necessary for other purposes.

The preferred stock, if authorized by the stockholders, would be a high grade investment security, and should be readily salable as and when funds are needed. The directors do not think it practicable under present market conditions to issue more common stock.

The present amount of stock authorized is $123,552,000, of which $109,296,000 is outstanding and the present proposed aggregate increase is $50,000,000 par value. It is not contemplated to issue this entire amount at this time, but that separate series will be issued over a period of years as the needs of the company shall require. The authority to issue the new stock will be so framed as to enable the directors to take advantage of market conditions. Approval of the Interstate Commerce Commission is required by law to be given to each issue as it is made. As the preferred stock is issued it will be offered to the common stockholders ratably, and such stockholders as do not care to subscribe will be given the opportunity to sell their subscription rights. In this way the common stockholders will have an opportunity to benefit from whatever advantages may be given the preferred stock.

Principal features of the proposed plan are the following, subject, however, to such changes, additions or subtractions as the stockholders at the meeting may determine:

Par amount of preferred stock at any time shall not exceed one-half of the par amount of common stock at the time outstanding.

Preferred stock shall be preferred both as to dividends and assets; and in case of dissolution of the company preferred stock shall be entitled to receive the redemption price thereof before any distribution shall be made to the common stock.

The preferred stock may be issued from time to time as the board of directors shall determine in one or more series, all series being of equal rank, but differing as to terms in the respects hereinafter stated, as the board of directors shall determine.

The preferred stock shall be entitled to receive from the surplus or net profits of the company, in each fiscal year, dividends at such rate or rates, not exceeding 7 per cent per annum, as shall be determined by the board of directors in connection with issue of the series, respectively, and expressed in the preferred stock certificates, before any dividend shall be paid upon the common stock, but such dividends shall be non-cumulative.

For the election of directors and in all other matters, the holders of the preferred stock shall be entitled to full voting rights as stockholders of the company. The preferred stock or any series thereof may, if the board of directors so determines at the time of the issue thereof, be convertible into common stock within such period and at such rate, taking the preferred stock at par and the common stock at not less than par, as the board of directors shall determine at the time of the issue.

Board of directors may at the time of issuing preferred stock determine that it shall be subject to redemption as a whole at a premium which shall not exceed 15 per cent of par.

Ask Authority to Issue Bonds.—The Illinois Central and the Chicago, St. Louis & New Orleans have filed a joint application with the Interstate Commerce Commission for authority to issue $1,924,000 of Illinois Central and Chicago, St. Louis & New Orleans joint first refunding mortgage 5 per cent bonds to reimburse the treasury of the Illinois Central for advances made from time to time for additions and betterments for the C., St. L. & N. E. The bonds are to be pledged from time to time, but are not to be sold.

LIVE OAK, PERRY & GULF.—*Authorized to Abandon Line.*—The Interstate Commerce Commission has issued a certificate authorizing the abandonment of a branch line from Murat Junction to Murat, Fla., 3.74 miles.

NEW ORLEANS, TEXAS & MEXICO.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $991,100 of first mortgage 6 per cent gold bonds to reimburse the treasury for expenditures for additions and betterments. The company had already secured authority for $533,700 of these bonds which have not been issued, and it asks a new order authorizing the issue of $457,400 additional.

NEW YORK, NEW HAVEN & HARTFORD.—*Asks Authority to Extend Loan.*—This company has applied to the Interstate Commerce Commission for authority to extend all or part of its outstanding European loan debentures, amounting to $27,582,691, for three years from April 1, 1922, with interest at 7 per cent instead of 4 per cent as at present. The European loan was floated in 1907, and the amount now to be extended represents part of a total original issue of 145,000,000 francs, or the equivalent then of $27,985,000. The issue was payable at the option of the holders in francs, pounds sterling or marks. In view of the present depreciated rate of exchange, as an inducement to holders to agree to the extension, it is proposed to extend the franc debentures, of which 69,762,500 are now outstanding, with a guarantee to the holders that at maturity on April 1, 1925, principal and interest will be collectible in dollars in New York at the rate of $96.50 for each 500 francs face value.

Dividends Declared

Canadian Pacific.—Common, 2½ per cent, quarterly, payable April 1 to holders of record March 1.

Delaware & Bound Brook.—2 per cent, quarterly, payable February 20 to holders of record February 11.

Erie & Pittsburgh.—1¾ per cent, quarterly, payable March 10 to holders of record February 28.

Green Bay & Western.—5 per cent, payable February 27 to holders of record February 25.

Trend of Railway Stock and Bond Prices

	Feb. 21	Last week	Last year
Average price of 20 representative railway stocks close of business	59.51	59.07	56.83
Average price of 20 representative railway bonds close of business	82.18	82.23	74.06

Railway Officers

Executive

E. H. Cox has been elected president of the recently organized Minarets & Western, with headquarters at San Francisco, Cal.

E. C. Lindley, vice-president and general counsel of the Great Northern, with headquarters at St. Paul, Minn., has resigned.

Financial, Legal and Accounting

Walker D. Hines, formerly director general of railroads, has been appointed eastern general counsel of the Great Northern.

Operating

F. M. Rutter has been appointed superintendent of the London division of the Canadian Pacific and **R. McKillop** to a similar position on the Bruce division, effective February 15.

Traffic

Charlton Messick has been elected treasurer and assistant secretary of the St. Louis-Southwestern, succeeding G. K. Warner, deceased.

J. W. McClymonds has been appointed manager of perishable freight service of the Western Pacific and Tidewater Southern, effective February 15, with headquarters at San Francisco.

William Haywood, general freight agent of the Illinois Central, with headquarters at Chicago, has had his jurisdiction extended over all matters relating to solicitation, except in Memphis, Tenn., and New Orleans, La.

W. B. Wheeler has been appointed general eastern agent of the Belt Railway of Chicago with headquarters at Pittsburgh, Pa. **A. C. Burgess** has been appointed commercial agent with headquarters at Minneapolis, Minn.

I. N. Randall has been appointed general agent, refrigerator service of the Union Pacific System, with headquarters at Omaha, Neb., succeeding J. W. McClymonds, who has resigned to accept service with another company.

F. W. Hampson, soliciting freight agent of the Norfolk & Western, with headquarters at Memphis, Tenn., has been promoted to commercial agent, in charge of the newly re-opened freight traffic office at Little Rock, Ark.

A. P. Smirl, whose appointment as assistant traffic manager of the Texas & Pacific, with headquarters at New Orleans, La., was announced in the *Railway Age* of February 18 (page 455), has been in the service of the Texas & Pacific for many years. Prior to Federal control, he was commercial agent, with headquarters at St. Louis, Mo. In 1917, he was promoted to division freight and passenger agent, with headquarters at Shreveport, La., and on March 1, 1920, to assistant general freight agent, with headquarters at Dallas, Tex., which latter position he was holding at the time of his recent promotion.

W. M. Penick, commercial agent of the Illinois Central, with headquarters at Pittsburgh, Pa., has been promoted to assistant general freight agent, with headquarters at Chicago. Mr. Penick was born at Union City, Tenn., on October 27, 1886. He entered railroad service in 1905 as a clerk in the local freight office of the Mobile & Ohio at Union City. He was promoted successively to clerk in the inbound freight department of the general offices at St. Louis, Mo., bill of lading clerk and chief clerk in the same offices, soliciting freight agent at Chicago, and traveling freight agent at that point, until 1917, when he left to enter the air service of the American army. He was appointed commercial agent of the Illinois Central, with headquarters at Pittsburgh, Pa., on March 1, 1920, which position he was holding at the time of his recent promotion.

Engineering, Maintenance of Way and Signaling

T. O. Russell has been appointed chief engineer of the Minarets & Western, with headquarters at Fresno, Cal.

F. M. Hawthorne, assistant division engineer of the Pennsylvania, with headquarters at Logansport, Ind., has been promoted to division engineer, with headquarters at Terre Haute, Ind., succeeding T. C. Herbert, promoted.

Purchasing and Stores

D. V. Fraser has been appointed assistant to the purchasing agent of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., succeeding **H. H. Kahrs,** resigned to enter other business.

Obituary

W. R. Beauprie, who was vice-president of the Gainesville Midland in 1918 when he retired, died in Atlanta, Ga., on January 13, 1922, as a result of a stroke of paralysis.

A. T. Hardin, vice-president in charge of operation of the New York Central Lines, died on February 21 at New York. Mr. Hardin was born in 1868. He was graduated in engineering from the University of South Carolina in 1894. Previous to that time, 1882, he had entered railway service as a telegraph operator on the Southern. He served that company, except during the period 1890-94, when he attended college, until 1898. He filled the positions of agent and stenographer and, after his graduation from college, was employed in the maintenance of way department. In 1898 he went with the New York Central as supervisor and division engineer. The following year he was promoted to engineer of track and, in 1903, to engineer maintenance of way. In 1905-06 he was assistant to the general manager and, thereafter, assistant general manager. In 1912 he became assistant vice-president and, in 1913, vice-president. Two years later he was appointed vice-president in charge of operation and, in 1916, he assumed a similar position for all the New York Central Lines. In this position he was serving at the time of his death.

A. T. Hardin

CROSSING A RAILWAY TRACK against the warning of a signal or a watchman, has been declared an offense, punishable by fine of not more than $200, by an ordinance adopted by the Board of Commissioners of Dallas, Tex.

THE NETHERLAND SYNDICATE, LTD., has been authorized by the Chinese government to place orders in Holland for the construction of 150 railway bridges of various spans. These bridges are for the eastern part of the Lunghai Railway which is now under construction.